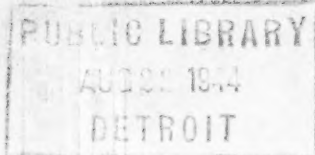


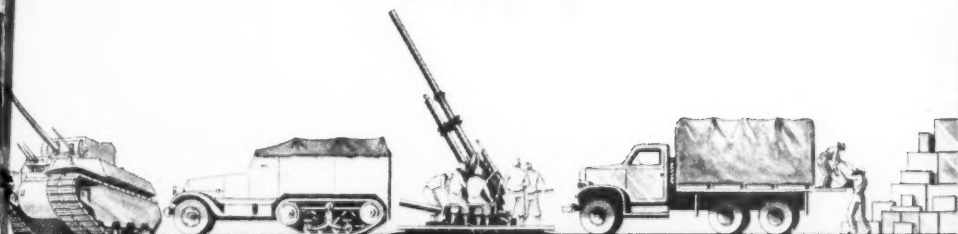
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MILITARY REVIEW

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COMMAND AND GENERAL STAFF SCHOOL

FORT LEAVENWORTH, KANSAS

A MONTHLY REVIEW OF MILITARY LITERATURE

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COMMAND AND GENERAL STAFF SCHOOL

MILITARY REVIEW

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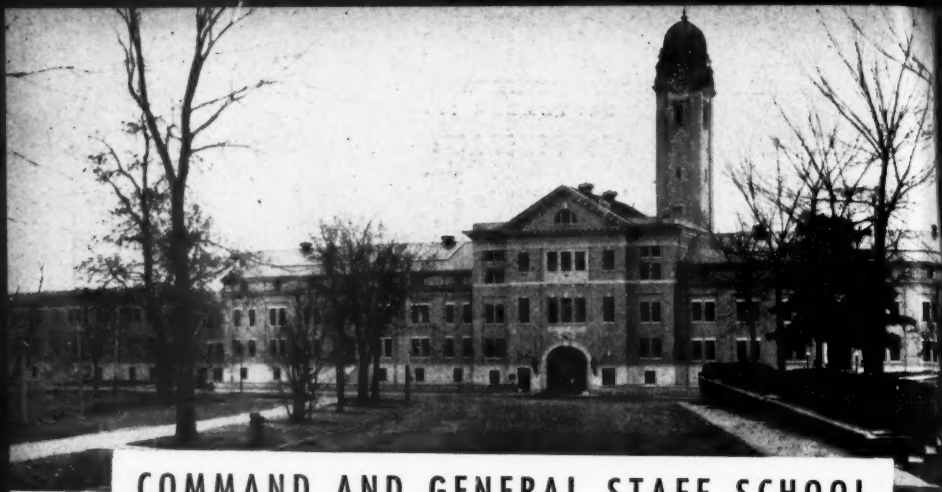
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What Makes an Army an Army

MAJOR GENERAL J. A. CRANE
Chief of U. S. Field Artillery Section, AFHQ

The author, in his letter accompanying this article, stated: "... it is based entirely on actual personal experiences. ... If it will do any good as a thought provoker, it is well worth the trouble."—
THE EDITOR.

SOMEWHERE along the line in the development of our command and general staff technique the field artillery dropped into a notch and stuck. It was probably in our enthusiasm for the combat team idea as a means of integrating infantry and artillery that we lost sight of the importance of field artillery as a separate supporting arm. Tactics and technique of the artillery battalion kept abreast if not ahead of the best in the world. The employment of division artillery, as such, received some attention. Corps artillery was forgotten. Yet the coordinated support of artillery is essential to corps action; without it the strength of an army is divided.

TACTICAL CONTROL

Division Artillery

Since the appearance of a device for indirect laying, this principle has been the distinguishing feature of artillery. It enables the commander to influence the course of battle or counter enemy action over a wide front without displacing or changing the disposition of his troops. The larger the force the more important this becomes. By the end of the last war great masses of artillery were directly controlled by the corps artillery commander, a major general on the staff of the corps commander. Massive rolling barrages preceded the advance of the infantry. These fires, closely controlled and coordinated, were used to further the progress of the force as a whole. To the doughboy, artillery fire became an inevitable part of the battle scene. Like the terrain and the weather it influenced his action, but its source was as remote and often as impersonal as the gods of the Greeks.

Perhaps for this reason, but more certain-

ly because of our limited training facilities during peacetime, the development of artillery and infantry grew farther and farther apart for almost twenty years. The undesirable features of this arrangement were apparent to infantry and artillery officers alike, and when the combat team idea came along we snapped it up. We went into the 1940 and '41 maneuvers with the idea that the corps commander need ask no further blessings than his divisions of combat teams. These teams had to be careful about tank attacks and know when to call for air support but in all other respects they were sleek, fast, hard-hitting, self-sufficient combat units. Of course, there was some corps artillery—a brigade, wasn't it?—that was supposed to do something about counterbattery, nobody was sure just what.

In spite of the difficulty of getting reality into the play of artillery in maneuvers, the division artillery commander soon saw where he stood in the picture and didn't like it. Whenever he tried to mass his fires on some particularly lucrative target, a traffic jam or tank concentration, he found his battalions scattered around, sited for antitank defense, half of them pointed to the rear. On the other hand, the division commander found that he must bring his artillery commander in on his planning. It was often embarrassing to discover capabilities of the artillery too late to be of use. Still more embarrassing was an occasionally belated realization of artillery limitations. A great stride had been made in the right direction.

Corps Artillery

And so we came to Africa. The corps artillery officer, a full colonel and fortunately, very decidedly a staff officer close to the corps commander, managed to bring along the artillery brigade, most of it at any rate, though few outside the immediate family knew why. It was only through his unflagging insistence that it was finally agreed to include one battalion of long-range guns in the shipment

of corps artillery to North Africa. Yet this battalion moved to the front from the docks and is the only unit that has been in action continuously, with only enough time out to move from one sector to another, since its first day of combat a month before we put a corps into the fight.

Starting in Africa with one battery guarding the Spanish Moroccan border, a battalion supporting the British in Tunisia, 800 miles away, this corps artillery brigade finally worked up to the direct control of thirteen battalions, including a Canadian regiment of 5.5-inch guns, in support of an American corps in Italy (see cut). It had supported a corps on fronts varying from seven to seventy miles. It had had battalions, regiments, and in one case the whole division artillery of an armored division, attached to it. It had formed artillery groups using the regimental headquarters and had furnished battalions and groups in support of divisions acting alone. We had learned that it took artillery and still more artillery to counter tanks and enemy batteries. Air support had done some good work in softening up strong points in Sicily but it took the constant pounding of artillery to keep the squareheads down. As one officer put it: If you have a good stout stick and an ugly opponent, will you throw the stick at him, then run and cut another one, or will you step boldly up and belabor him with it? Incidentally, in such a situation it is well to provide yourself with a stick a little heavier and a little longer than your opponent's and seize it with a firm grasp.

The almighty division did its stuff and did it well. But the tough country around Mateur showed that often the commander's plan had to be built up around the capabilities of his artillery. Not only that but it was seen that a division could invite trouble by getting beyond the range of assistance from the artillery in adjacent sectors. Artillery planning became a concern of the corps. The corps commander must have an artillery officer of rank and experience, capable of advising him in the employment of his artillery, of controlling the employment of that artillery, and of furnishing artillery intelligence on which to base

his estimate of the enemy capabilities and intentions, and thus his own plan.

The keynote of all battle experience reports on artillery employment during this time has been flexibility. As a matter of choice, flexibility is a desirable asset, as a necessity it smacks of instability or at least lack of organization. One counterbattery officer compared the organization of his section to Harriet Beecher Stowe's Topsy. Fortunately, we had our British Allies' experience to draw from in developing our technique in the operation of artillery control. Unfortunately, we do not have their unbroken chain of artillery command to solidify it. The lessons learned must be learned again by each new division, corps, or army as it comes into the fight. But the second stride has been taken.

ADMINISTRATION

Experience has shown that tactical employment will work itself out, but what about the administrative problems? The division artillery is securely fixed under the firm guiding hand of a brigadier general, division artillery commander. It is part of a unit recognized by all administrative echelons. Not so the separate battalion. Will this new idea of having twenty or thirty separate battalions of artillery working directly with an harassed Army Quartermaster or AG work? We don't know yet, but we think not.

The brigade was not an administrative headquarters; the regiment had no supply functions, but it didn't take a month after the organization of our first corps brigade to find that the administrative echelons were not willing to deal separately with our eleven supply officers and five personnel adjutants. This understandable reluctance was even more pronounced in combat. We centralized administration in the brigade and there it has remained. Even then we had our little problems, too numerous to list in detail. The source of most of these troubles was, of course, that we had no recognized organization. The term "Combat Troops" meant divisions. Corps troops were non-combat troops. This in spite of the fact that some of our corps artillery battalions were the only units

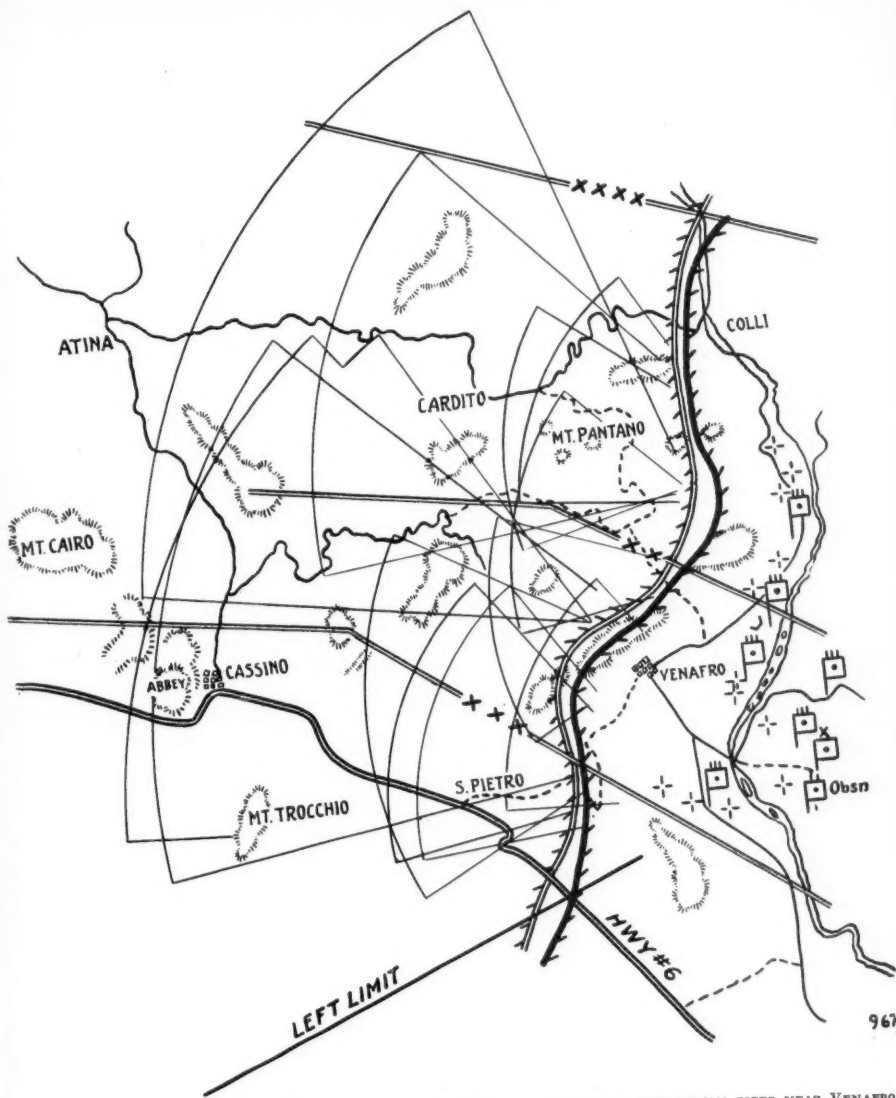


CHART SHOWING THE FIRE CAPABILITIES OF THE CORPS ARTILLERY IN SUPPORT OF A TWO-DIVISION CORPS NEAR VENAFRO, ITALY, DEMONSTRATING THE IMPORTANCE OF COMMAND CONTROL OF ARTILLERY FIRES.

which have remained in combat continuously from the beginning of every campaign. Priority in all supply was rightly given to combat troops. The result was that some of our cannoneers went for weeks without cigarettes while their buddies in the division artillery smoked. A minor point but an irritating one. More serious was the difficulty we experienced, for the same reason, in obtaining clothing and other equipment for units of the corps artillery during the preparations for the Sicilian campaign.

Look at the other side of the picture. A group commander has an officer on his little staff who just isn't working out as a staff officer though possibly good material for battery executive or forward observer. He has to make a dicker with one of the battalions temporarily under his control, and then go to army to effect the transfer. Again, a minor point but an irritating one. Battalions constantly changing from one group to another suffer in morale and discipline. They feel no sense of loyalty to a group commander who cannot know them or their special problems. The group commander, on the other hand, cannot be expected to get the best out of battalions that are strange to him.

In other words, separate battalions and separate group headquarters are a nuisance. They work under a decided handicap and constitute an uncoordinated mass of administrative chaff in an otherwise well organized system. There is a decided need for extra battalions of artillery to bolster up the organic artillery when the going is tough. There is no need whatsoever to break up organic corps artillery into separate battalions and separate headquarters like headless bodies and bodyless heads. That such a breakdown is needed to give flexibility to artillery support is a mistaken and highly theoretical assumption, is readily shown by the amazing flexibility of organization demonstrated by the only American artillery brigade present during the first year of fighting in the Mediterranean theater. Regimental headquarters are perfectly capable of controlling additional battalions. The tactical separation of battalions from the parent regiment causes no

undue hardship. On the contrary it has been found that these detached battalions make a special effort out of pride in their own organization.

ARTILLERY PLANNING

Still higher on the scale:

There is the problem of having the right kind of artillery in the proper amounts in the theater. Tank destroyers, tanks, and heavy anti-aircraft have been used as field artillery. Special purpose paratroop and pack battalions have been used as ordinary reinforcing artillery. The need for the super-long-range 8-inch gun was recognized and accepted by all artillerymen up to the army eighteen months before it was finally received in the theater.

Tables of organization and equipment are based on minimum requirements. In every theater and under all sorts of varying conditions, special allowances have to be made. As a result of the need for a bulldozer to assist in the preparation of difficult positions, it was suggested that every battalion be permanently equipped with this bulky matériel, but the more practicable plan of establishing an operations pool was adopted.

Overstrength for units in combat is allowed only to infantry based on the indisputable fact that the infantry receives a much larger percentage of casualties. The result is that the artillery functions continuously twenty-four hours a day, with an understrength of the five to seven percent normally absent.

Replacements filter into artillery units slowly but there is no opportunity for specialist training during combat. Schools for specialists and refresher training are needed. A two-week period for rehabilitation and training at the end of, say, ninety days of combat would be of inestimable value to the battalion.

Does anyone still doubt that there must be some one at the top to advise the theater commander in these and the myriad other questions that come up concerning the artillery?

CONCLUSION

The answer, I am convinced, is to return

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to the old organization for field artillery that we had in the last war. We all know that the infantry battalion with a battery of field artillery is the basic combat unit, but when the regiment is in the picture there must be artillery battalion control. Our infantry divisions in all theaters have demonstrated the

soundness of their knowledge that the division is more than a loose collection of combat teams. Why should we question the value of an unbroken chain of command in the artillery—the supporting arm furnishing the link that makes a corps more than a group of divisions, that makes an army an army?

Airfield Camouflage

From an article by Lieutenant Colonel Merrill E. De Long, AAF Representative, Engineer Board, Fort Belvoir, Virginia, in *Air Force* April 1944.

WHEN the enemy bombs you, he is after three things: planes, other equipment, and personnel. One way to cross him up is to scatter everything over the landscape. It may be a bit inconvenient, having 55-gallon drums of gasoline placed yards apart over a large area, but it is better than having all your gasoline go up with one bomb hit. If reasonable dispersion has been carried out at a forward base, it will be tough for the enemy to knock the fields out of action. And then if the same precautions are taken with tents and shelters in the bivouac, an enemy is going to have a hard time doing much antipersonnel work with his machine guns.

When you move into a new field, it is a good idea to look around a little and pick out a spot where you can dig in or be covered so that a Jap or a German can't see you from a couple of miles away. This sounds a little easy, but it takes time and careful planning to do it right—and it's the job of everyone in the new area.

Artificial cover is helpful, but it takes a lot of time and work to put up fishnets, garnish them properly, and, as the months go by, change the garnishing to fit the seasons—green for spring and summer, brown for fall and winter. For similar reasons, large scale airfield camouflage is even more difficult to do. So if possible, seek areas where there is natural cover and save all the trees and local garnish you can.

Airplanes and equipment hidden among trees are almost impossible to see from the air, and if care is taken they will not show up on a photographic plate.

Another good rule after a bivouac has been set up is to avoid cutting too many trails and roads which can be seen from above. Sometimes it isn't easy to find localities with good natural shelter, and in those places some effort should be made to cover equipment and buildings with garnished nets. The main idea is not so much to hide whatever you are covering but to make it less noticeable to a reconnaissance plane. An airplane's shadow stands out as clearly, or more so, than an airplane. So reduce the shadow.

While you can see through a garnished net from below, it does a lot of good in absorbing the shadows or breaking the lines of a truck or plane as seen from above. It is important when using a net that it be stretched over the object, and, better yet, even raised so it does not rest on the tent ridge or truck top, or the top point of whatever you are concealing. If there aren't enough nets to go around, it is best to use them over tech vans, radio trucks, and equipment that is hard to replace if destroyed.

Use all existing buildings and roads. Where new buildings are constructed, design and arrange them so that they will appear to be a part of the area. Any painting that is done should either blend the buildings into the background or make them appear like any other buildings in the vicinity. These basic rules hold true in China, New Guinea, Italy, and wherever else the AAF is fighting.

This all sounds pretty fundamental, and it is. It might even mean saving your neck.

Pongo to Ground Liaison Officer

An Essay on the Missing Link

LIEUTENANT COLONEL P. G. WREFORD BROWN, *British Army Staff*

After serving through the Abyssinian campaign in the G-2 Section of General Sir William Platt's staff, the author was assigned as Air Staff Officer to 8th Army HQ, on its formation. He was later assigned to HQ RAF the Levant, covering Syria, Palestine, and Cyprus, as a GLO (Ground Liaison Officer). After five and a half years' service in the Middle East he was posted to the British Army Staff in U. S., and is now Chief Instructor at the U. S. Army Air Forces GLO School, Key Field, Meridian, Mississippi.—THE EDITOR.

NEVER since Charles Darwin brought the wrath of the Victorian beauties on his own head by trying to find the "missing link" between the monkey and humanity has there been so much heated argument and so many bruised egos as have been the result of the search for the "missing link" between air and ground warfare. And indeed, never has there been more pride or prejudice. People's prejudices are merely preconceived opinions held without consideration of changing conditions, for opinions, in their turn, are the direct outcome of experience and environment. How does it occur, then, that the ground and the air, fighting the same battle and faced with an exactly similar military situation, should have such widely divergent opinions? The answer is, I think—because they each hold a different point of view. The same battle which means shelling, bayonet attacks, and tank battles to the soldier on the ground is bound to produce different problems, different fears, different opinions in the minds of airmen, who are fighting in a different dimension and whose base may well be some hundreds of miles behind the front line. Both opinions may be perfectly logical and reasonable—but to follow either of them without reference to the other would be to jeopardize the logic of both. In fact, there is only one constant, similar factor common to both serv-

ices—their goal—the destruction of the enemy.

Therefore, the link that is missing is a link between two points of view. A link that will mould ideas born of differing circumstances and dissimilar environment into one cohesive, crystalized operational policy. From the drawing boards of thought there came many proposals. Soldiers quite naturally proposed that the Air Force should come under the control of the Ground Forces, and the airmen vice versa. But wherever this was tried out an inherent weakness became apparent. The logic of the force controlled was sacrificed on the altar of the logic of the force controlling. In fact, it became obvious that though the two different points of view must be combined, they must not be fused to the degree that one or other of them was forced to lose its original identity. And thus we all realized that the answer lay not in control but in coordination. Again academic military minds applied themselves to the task. How was coordination to be accomplished? How was confusion to be avoided without fusion of command? Their answer was liaison: the creation of a body of men so trained that their outlook on war would be a compromise of both air and ground points of view and who could thereby represent fairly the case of one force to the other, without having their opinions biased by the responsibility of command.

Now liaison or "linking" can be divided into two parts. That is to say that its efficacy demands two prerequisites: adequate communication and personal contact, both in themselves presenting problems and both requiring solutions. Take communication first. Military experts in America and England were quick to realize that efficient air-ground liaison with its primary essential, speed, would demand a special, express signals network uncluttered by the welter of administrative and operational traffic

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that usually floods the normal channels. Hence the American Air Party Communication System and the British Air Support Signals System were conceived and born. Motivated by necessity and sired by logic, these two systems of communication, with due respect for their common heredity, virtually remain the same. But over the problem of personal contact, the American Forces and the British Forces differed in their solution.

From which of the two services should the Liaison Officer, the purveyor of personal contact, be chosen? Who would make the most effective link, the airman or the soldier? Where no experience exists on which to base an opinion, a decision must be produced from surmise and argument, and though debate may have a common inspiration and a common goal, the results are very often quite different. Such was the case with the American and British Forces. The former decided to send an Air Force officer to live with the Ground Forces, the Air Party Officer, and the latter sent a Ground Force officer to live with the Air Forces, the Ground Liaison Officer. It would be unfair if the writer at this juncture attempted to draw any comparison between the efficacy of the two systems, since the reader is unable to record either his concurrence or his objections. There is reasonable ground for argument in both directions and indeed it is the contention of many who have studied these problems that the perfect answer lies in a compromise of both solutions. Suffice to say that it seems likely that the future American setup, whilst accepting, as it has done to some extent already, the British Ground Liaison Officer System, will retain with some possible modifications the original Air Party organization. Thus it is to be hoped that when the new American ground-air doctrine hardens into actuality, as it shows signs of doing already, it will combine the best features of the original British and American solutions.

The Air Party System will, no doubt, be familiar to all my readers, but the Ground Liaison Officer, being a newcomer to this continent, warrants some explanation. First let us examine the possible train of thought that

led the British to choose a Ground Force officer as their medium for liaison and recently caused the American Forces to take a leaf from the British book.

Firstly, consider the nature and the amount of knowledge that each force needs to know about the other, in order to produce an effective combined operation. Is it not true that the ground only needs to know the general policy of the air? It is not going to help the soldier to win his particular battle if he is told that, in future, fighter sweeps will be flown from northeast to southwest or that henceforward bomber boxes will be six instead of eight. All he needs to know is that the tasks asked for are going to be accomplished—not how it is proposed to execute them. But on the other hand, the air, if it is to carry out effective direct air attack, must often need to know the details of a purely local, tactical situation. The airman must be briefed as to the exact positions of forward troops, when they are likely to move, how he is to recognize them when he sees them, and a multitude of other intimate details which may affect his approach, his height, and his identification of the target. Hence, if you agree with this hypothesis, then surely the ground officer is the man primarily to do the job of liaison, since to him the more detailed ground picture is easily understood, more quickly assimilated, and more easily explicable.

Secondly, in the main, the Air Force officer is a specialist of high degree. He operates in his own private medium and is often divorced both in thought and dwelling place by considerable distances from the troops whom he is supporting and even from the other branches of the air with whom he is cooperating, whereas the Ground Force officer is by the nature of his job a jack-of-all-trades. Though he be doughboy, cavalryman, or artilleryman, he works in close contact with the other branches of the Ground Forces, and understands their problems, capabilities, and limitations. Hence it is suggested that in the Air Forces one member of a specialist branch—say fighter aviation—knows less of another specialist branch of his own service

—say photographic reconnaissance—than is the case with his counterpart in the Ground Forces. Therefore, whilst it is doubtful whether a fighter pilot could give an adequate discourse to the Ground Forces on the technicalities of air photography, it is quite certain that a good infantryman could lecture the Air Forces on the tactical use of artillery or elementary tank tactics. Now lectures on the tactical uses, the limitations, and the powers of all arms is one of the Liaison Officer's main duties if he is to accomplish his intention of creating mutual understanding between forces. Therefore, when making our decision as to what service should provide liaison, we must take the above facts into account.

Thirdly (and this is probably the most important argument for liaison being *from* the Ground Forces *to* the Air Forces), the mutual effect of air and ground operations on one another. A Tactical Air Force, as its very name implies, intervenes in the ground battle, and its proper coordination with ground activities may well dictate the success or failure of an operation, whereas the activities of the ground forces seldom have an *immediate* effect on the air force and its tactics.

As an example, at Khasr Rhilane, on the extreme southwest flank of the Mareth Line, the Allied light reconce [reconnaissance] units were attacked by a strong enemy armored column. The prompt use of air power completely broke up the enemy column, enabling reconnaissance to continue unopposed. But this incident itself and the subsequent success of the reconce column in finding a short cut through the Matmata Hills did not for one moment affect the state of the air battle. It was only later, much later, during the actual battle of Mareth that the enemy were driven off their forward landing grounds and the air situation was thus changed. Hence the point is this. The success of the air at Khasr Rhilane had an immediate and direct result affecting the small reconce force, and indeed, very soon after affected the main ground force battle itself. Whereas the success of the reconce force in continuing their operations

only affected the air force indirectly and some considerable time later.

Is it not logical, therefore, that liaison in air-ground operations should come from the force more immediately affected by those operations, in other words the Ground Forces?

You may or you may not agree with the arguments put before you, for again we all have our points of view which shape our opinions and the expression of our thoughts. But the fact remains that this is the train of thought that caused the Ground Liaison Officer to be born and is probably the argument that convinced the American powers—that are of the GLO's value to the point of acceptance of the system. That the GLO has been a success within the British Forces is made evident by the study of such air-ground operations as occurred at Alamein, El Hamma, and Cape Bon. These results can at least provide a reasonable basis for confidence that the GLO's success will be repeated when American GLO's play similar parts with American forces.

Since, no doubt, almost every officer in every service will in the future, at some time or another, come into contact with the GLO, it is as well that you should know what to expect in regard to his capabilities, his duties, and his personality. Since his duties are the direct outcome of his capabilities, as judged by results during his operational employment with British Forces, these may not necessarily be reproduced in faithful detail when a directive based on American experience is issued by U. S. Forces. However, the following general headings will serve as a guide. Here they are:

1. To keep the air force in the ground picture, thus enabling them to carry out direct air attack and reconnaissance more effectively.

2. To pass reconnaissance information to ground forces resultant from operations by *all* types of aircraft. (Note the word *all*. Reconnaissance aircraft have been referred to as the eyes of the ground forces, but a fact that for a long time escaped the notice of ground commanders is that *every* aircraft has at least one pair of eyes also. In other words,

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every aircraft that flies over enemy lines, no matter what its primary mission, is a potential source of reconnaissance information.)

3. To keep the ground forces in the air picture, by keeping them posted as to the amount of air effort available, the limitations imposed on the air effort by the existing state of air superiority, and the characteristics of the different types of aircraft composing the air striking force.

4. To help brief and interrogate all reconnaissance and ground attack missions.

5. To establish good relations and mutual understanding between the two services.

These, very briefly, are the GLO's duties. Headings like the above are never very impressive things until you take a moment and think about them. Start thinking about the last one, for instance. You, like the GLO, will find plenty there on which to chew. Battles never go exactly as planned. Things go wrong on both sides of the fence. A ground attack is held up by rain flooding a river; an air mission cannot take off because of a local ground mist. You can go on forever quoting examples of sudden, unexpected contingencies that, if not explained and understood, might possibly result in the loss of faith in one service towards the other. And remember this is only one heading of many.

Now you may reasonably wonder where and in what circumstances you may expect to find this "missing link," the GLO. Well, firstly, as has been said, he will be found living with the Air Force, and though the U. S. establishments are not yet officially approved, he may be expected at every Tactical Reconnaissance Squadron and Group, at every Fighter, Fighter-Bomber, Light Bomber, and Medium Bomber Group, and also with some sections of the Strategic Air Force. On the Ground Force side he will also be taking up duties as Ground-Air Staff Officer at armies, corps, and divisions, thus completing the logical circle of liaison.

A word about the man himself. What can you expect to find? Will he be pompous, sycophantic, vague, factual, serious, genial, or (since he represents the middle of the road) just diplomatically mediocre? Well, a

good GLO will be all of these things, varying with the situation that surrounds him. In fact, just like any good staff officer he will adapt himself to circumstance, as indeed he has had to do throughout his history. Since personality is largely made up of the total effect of past events, it may be as well at this stage to give readers an idea of the new American GLO's heritage.

The first GLO's (or Air Intelligence Liaison Officers, as the British then called them) were born with the advent of air reconnaissance in World War I—and as such their activities were confined entirely to units of what we now know as Tactical Reconnaissance Aviation. But the GLO, as he is known today, working with all types of aviation, bombers, fighters, and visual and photographic reconnaissance in Italy, in the SWPA, and in the invasion forces, was born (if not conceived) at a very stormy period in British inter-service relations.

The British ground forces in every theater, owing to lack of equipment, tottering foreign political regimes, and lack of numbers, were forced to fight defensive battles against great odds. The higher command, with a tiny air force at their disposal, quite rightly held back what air power they had, so that it could be used to cover evacuation should such a dire necessity occur, as in the case of the evacuation from France. History has taught us all the wisdom of such a policy, but at the time the ground troops thought differently. They did not understand the problems of the higher command and had only in their minds the bitter memories of enemy dive-bombers going about their hellish work unmolested and undisturbed. And at the same time the Air Force didn't realize the reason why the Ground Forces were continually on the run. Somebody had to give the answer to both services, and the GLO was chosen to do the job. But no wonder that his first efforts were received with some cynicism from either side of the fence. Indeed the Air Forces, with a truly Darwinian disrespect for the pioneer "missing links," referred to them as "pongos"—a small brown animal with very little sense, that keeps very

close to the ground—but the GLO's, who either had no knowledge of anthropological definition or more likely thought the term was some form of back-handed compliment since it did indeed refer to the "missing link," accepted their opprobrious nickname and carried on with their jobs of spreading their good-neighbor gospel. Several years have passed since those bad, bad days of ignorance, misunderstanding, and mutual cynicism. The GLO's have had their effect. The word "pongo" remains, but now, instead of the term being one of opprobrium, it is an expression of endearment between the airman and the ground soldier. Yes, the name sticks. But it carries a different meaning. Is this not, in itself, a clearly recognizable triumph for those early GLO's? It is far easier to coin a new word than it is to change an old word's meaning. This latter they have

done; and since, at least in the British Forces, the name remains, cannot we carry its anthropological inference further? Is not the GLO even now a fellow that, in the heart of him, still "stays very close to the ground," though half his interests and indeed half his affections are in the air? Surely, now he can be likened to that strange animal that lives in the Australian bush—the duck-billed platypus, an animal whose natural home is the ground, yet has an affection for water, a pair of vestigial wings, and like the GLO, can sometimes even be expected to lay an egg. In other words, an officer who can be equally at home in all three elements, but on the other hand is not hidebound by any particular preference for any one of them.

The pongo (in its original meaning) is dead. Long live the GLO—the duck-billed platypus!!

Food for British Soldiers

BEFORE the invasion of the continent, a British source gave the following description of the food that was prepared for Britain's soldiers to take with them on D-day:

"In addition to the composite packs carried by his unit, each soldier will carry two of the 'twenty-four-hour ration packs' in his pockets. This pack consists of a water-proof box containing two blocks of oatmeal (each of which becomes, by the addition of water, a generous plateful of porridge, already sweetened), ten biscuits, a block of meat, a packet of salt, eight tea-sugar-milk blocks, two slabs of raisin-chocolate, one of vitaminized chocolate, half an ounce of meat, two packets of chewing gum, and four tablets of sugar.

"Besides the two twenty-four-hour ration packs there will be an emergency ration consisting of meat extract and vitaminized chocolate. Each soldier will carry a small, folding, pocket-fitting cooker, complete with a week's supply of fuel tablets. He will also have a small water sterilizing outfit.

"The composite packs carried by the units, sometimes known as 'fourteen-man packs,' are expected to feed the troops for the first two days or so before the positions become stabilized and field kitchens can become operative. These packs have already been a great success in Africa. They contain food for fourteen men and provide for seven complete changes in diet. Included in them are the famous self-heating soup cans into which fuzes are built down the middle. When the fuze is lighted, hot soup is available within four minutes. The American forces were so impressed with this British invention that they immediately ordered one million cans.

"There are smaller composite packs for tank and armored-car crews, and bigger 'invalid packs' contain enough for two hundred casualties for one day. These can be dropped from the air behind the lines. Packs have been especially designed containing jungle rations for troops in the Far East. These are in containers capable of resisting intense heat and can also be dropped from the air."

The Invasion of Normandy

COLONEL CONRAD H. LANZA

NOTE: This article is based upon the latest information which is available at date of writing, and which is not confidential.—THE AUTHOR.

THE ALLIED STRATEGICAL PLAN

AN invasion of France had long been contemplated by the Allies. It had been requested by Russia in the early part of June 1942. Russia desired that it be carried into effect that year. The Combined Chiefs of Staffs Board made a report in the same month. The invasion desired could not be carried out in 1942, as it would be impracticable to assemble the necessary troops and matériel in time. It could be carried out in 1943, provided no other major undertaking occurred elsewhere. An invasion of North Africa then contemplated was a major undertaking, and if this was proceeded with, an invasion of France could not take place until 1944. Still, in June of 1942, at a conference in Washington between President Roosevelt and Mr. Churchill, respectively leaders of the United States and the British Empire, the decision appears to have been made that the invasion of France would take place in 1944.

Two years have been available for planning and preparation. The results of British investigations, and past experiences, were available to start with. So far as now known, the plans have been elaborate. They have called for large forces, and an unbelievable mass of matériel. All that was necessary was provided, and appropriately assembled in the British Isles.

Most thorough investigations were made as to the terrain and enemy forces in possible invasion areas. Special training was given to units for tasks to which they were to be assigned. Supplies and transportation, including complete railroad installations, were stored awaiting the invasion. The intent was to leave nothing to chance, but to see to it that once the troops landed in France they should roll onwards without halt. In his Quebec speech in August 1943, Mr. Churchill promised that there would be no invasion until

everything was ready to keep it moving forward.

The strength of the Allies available for the invasion is a secret. Enemy estimates are that it amounts to between eighty and a hundred American and British divisions, including ten airborne divisions. For this study, ninety divisions will be assumed. According to Allied estimates, the enemy had in France and the Low Countries between sixty and sixty-five divisions. Assuming sixty as probable, the Allies would have a numerical superiority of three to two. This in numbers. In the air the Allies believed that they had a crushing superiority, and on the sea an overwhelming one. Moreover it was intended, and believed to have been accomplished, that the ground troops would have better weapons, and more of them proportionately, than the enemy. Not least among the Allied advantages were large replacement reserves, designed to maintain forward troops at Table of Organization strength by daily drafts. It was hoped that troops could be kept fresh and with complete equipment, in contrast with the enemy whose divisions it was believed could not be so maintained.

The strategical plan did not contemplate winning by Napoleonic maneuvers. The enemy was to be beaten by crushing him under superior numbers and weapons.

In the two years that have passed since Russia asked for an invasion, the strategical situation has materially changed. In 1942, Russian armies had been forced back to the Volga River and were seeking diversionary movements to draw off enemy pressure. In 1944, the Russian armies have been completely reestablished, and are able to take care of themselves. The invasion of France is but one of several attacks against Germany which collectively are intended to win the war. It is not even the main effort.

THE AXIS STRATEGICAL PLAN

It being impracticable for the Axis to assume the offensive against the gathering Allied forces in Britain, due to lack of sea

and air power, the Germans have hoped to win a decision in the west by defeating an Allied invasion. It was believed that if the Allies could be defeated in the west, the political reactions in the United States and Great Britain might redound to the Axis advantage. Possibly Russia might become so disgusted that in case of a German victory in the west she might consider a separate peace.

Whereas for the Allies the invasion of France is not necessarily a major blow, for the Axis its defeat is their main mission. To accomplish this, German forces have been withdrawn in other theaters of operation. Vast areas have been given up in Russia. Only minimum forces have been supplied to the Italian front. This has been going on for over a year.

According to reports which trickled through from Finland, Germany informed that small country that she fully expected that the Allies would succeed in landing large forces and establish a Second Front in France and/or the Low Countries. The Germans hoped to make the landing as bloody for the Allies as possible, and to furnish only such forces to meet each landing as it occurred as to contain it. Particularly was it intended to cause losses in men and matériel greater than the Allies had expected, and thereby reduce the number available for second and later landings. A GHQ reserve would be kept, but was not to be used, if possible to avoid doing so, before the Allies had committed all of their divisions. It then would be employed according to the situation at that time.

In the meantime, on all fronts other than the west the Axis armies would remain on the strategical defensive.

Being inferior in numbers and probably in equipment on all fronts, the Axis does depend on good generalship and maneuver to overcome the tremendous superiority of its opponents in men and matériel.

The two opposing strategical plans, which are in no ways similar, should be kept in mind in considering the events connected with the initial invasion of western Europe.

THE INVASION OF WESTERN NORMANDY

Prime Minister Churchill, on 6 June, stated that the invasion of Normandy, which commenced that day, was but the first of others to come. It is therefore a preliminary operation. Its purpose has been first to establish a base by the capture of the very good port of Cherbourg.

The 2d British Army, Lieutenant General Miles C. Dempsey, landed on the coast opposite the towns of Bayeux and Caen, six and nine miles inland, both inclusive. Through these towns ran the main road and railroad from Cherbourg to Paris. Both are important road centers. The plan called for the capture of Caen; probably Bayeux also.

The 1st American Army, Lieutenant General Omar N. Bradley, landed with its V Corps, Major General Leonard C. Gerow, east of the Grandcamp Rocks to St. Laurent; and with its VII Corps, Major General J. Lawton Collins, on the east side of the Cotentin Peninsula, at the north center of which is Cherbourg.

The two armies together formed the 21st Army Group, under General Sir Bernard L. Montgomery.

Airborne troops were extensively employed. The British dropped during the night, 5-6 June, their 6th Airborne Division near Caen, to seize and hold bridges between Caen and the coast and thereby facilitate the advance of the seaborne troops on Caen. This division succeeded in holding until the seaborne troops joined them north of Caen, but the subsequent attack on that town failed.

The Americans dropped their 82d Airborne Division several miles inland from the east coast of Cotentin, to facilitate the subsequent deployment of the VII Corps. This succeeded.

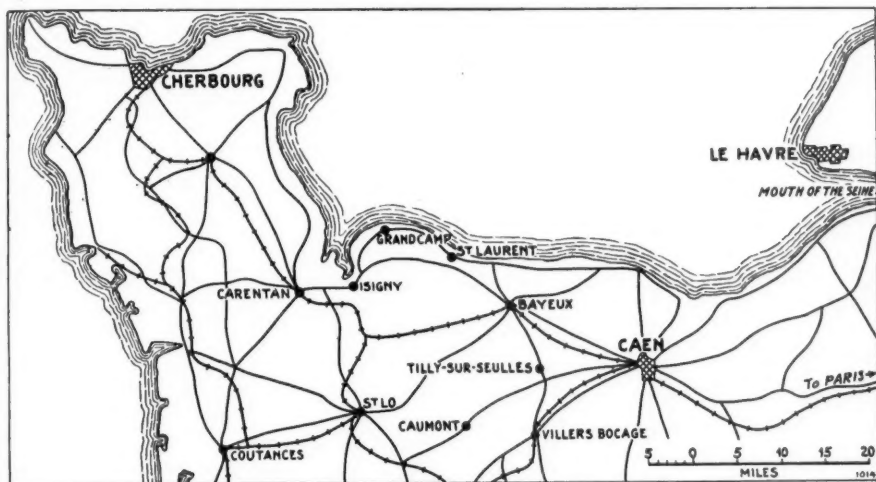
Other airborne troops were dropped, Americans near Coutances on the west side of Cotentin at the base of the peninsula, and British to the south and east of Caen. All failed, as far as now known.

The German coast defenses were strong, and included obstacles and numerous works. The long training of the Allies now came to their advantage. Knowing what and where the defenses were, suitable assault groups

had been everywhere provided, and in most places the local defenses were rather quickly overcome.

The U. S. V Corps was, at landing, separated from forces on both flanks. It was confronted by a German division which happened to be having maneuvers in the vicinity. This corps, landing two divisions—1st and 29th—on 6 June, was unable to get away from the beach until another division—the 2d—was landed on the 7th. It then advanced

21st Panzer Division. This four days' fight was fought over rolling country west from Caen, and particularly in the vicinity of Tilly-sur-Seulles. There were woods and bushes over a part of the territory, affording concealment. This long engagement was fiercely fought, troops advancing and retreating. Both sides used considerable artillery. The British had the advantage of support from naval guns controlled by forward observers either on the ground or in the air.



THE COTENTIN PENINSULA OF NORMANDY.

southwest towards Isigny and Carentan with a view to connecting with the VII Corps. The latter developed its own beachhead.

The right of the British army walked into Bayeux on 7 June, almost unopposed. This city was found practically uninjured. It seems that there were no Germans in this area other than observation forces. This was not known at the time, and as Caen was the objective, troops closed in in that direction. Next day, an attack failed. It was evident that it was strongly defended.

On 9 June, the British commenced a four-day battle, using armored forces, in order to drive the enemy out of Caen. The British 7th and 9th Armored Divisions were available. They were soon engaged with the German

Notwithstanding all efforts, the British made no substantial gains.

On 12 June, it was realized that the enemy did not have important forces in the Bayeux sector. That night the British armor withdrew to south of Bayeux. Very early in the morning it attacked southwards, and quickly reached the vicinity of Caumont. Here there were some Germans recently arrived. The armored force made a detachment of about twenty tanks to handle this situation. Under this protection, the main body turned eastwards and raced for Villers Bocage, with a view of thence attacking Caen from the rear.

The British advance guard reached Villers Bocage around 7:00 AM (British Daylight Time, which is two hours ahead of real local

time). The German armor, parts of three panzer divisions, by this time aware of what was happening, had gone south from the vicinity of Tilly to intercept the British. They cut in between the advance guard and the main body. A very hot battle followed which lasted all day. The Germans won back Villers Bocage, and claim to have destroyed the British detachment left near Caumont. British infantry which had followed their tanks came up, and were able to hold nearly all the ground the tanks had crossed, thereby advancing the front from Bayeux (inclusive) to Caen (exclusive) as far as Caumont—Villers Bocage—Caen (all exclusive). Strong British attempts during the next day failed to advance the line. Since that battle, and up to 10 July when this account closes, the situation has only slightly changed within the zone of action of the British 2d Army. Repeated efforts to capture Caen from the north, and by envelopment from the east and west, finally resulted in the occupation of that town.

In the meantime, the American 1st Army fought an independent action. Its V Corps rapidly established liaison with the British on their left. More opposition was met on the right. Good liaison with the VII Corps was accomplished on 14 June upon the capture of Carentan.

On 16 June, enemy withdrawal of trains and artillery from Cherbourg southwards was observed. The VII Corps thereupon advanced westwards towards the far coast of the Cotentin Peninsula. Meeting surprisingly little resistance, this objective was reached on the 18th.

The VII Corps then turned north against Cherbourg, now cut off from the main German army. Night and day this attack was pushed under difficult conditions. Strong air bombings and intense artillery preparations neutralized enemy posts before infantry attacked. Guns of many warships controlled by forward observers heavily shelled selected targets. Due to terrain, tanks were only of limited use. Under uninterrupted pressure, Cherbourg fell on 26 June. Thus a prime objective of the preliminary invasion of west-

ern Europe was secured twenty days after the original landing.

On 3 July, the American 1st Army, being regrouped, commenced a general offensive towards the south on a thirty-five mile front. By 10 July, this attack had made an average progress of under five miles. Meeting strenuous resistance, it was then still in progress.

COMMENTS

1. An evaluation of the campaign can not be made until it is known what was sought to be accomplished. Considering the strategical plan, except for the capture of Cherbourg, the invasion just about maintained itself. The rolling onward stage was yet to come.

2. The capture of Cherbourg was an outstanding success. Its quick capture reflects credit on the troops engaged, and on the generals who directed them.

3. The Allies estimated that in the first month about fifteen German divisions had been engaged out of sixty, or twenty-five percent. The Germans estimated that the Allies had engaged twenty-five to thirty divisions out of ninety, or between twenty-six and thirty-three percent. If these estimates are correct, the Allies have used somewhat more than their proportionate share of reserves.

4. The Allies have engaged in a remarkably intense bombing of German lines of communication. The mission was to prevent the bringing forward of reserves. As the German reserves didn't try to come forward, the success of this plan is uncertain. This idea had twice before been tried in Italy. It didn't work. The enemy found means to detour around bomb craters and demolished bridges.

5. The Germans since 15 June have bombed London with self-flying bombs. Regardless of damage inflicted, which is serious but not primarily of military importance, it has caused the Allies to detail considerable air forces to meet this new method of harassing fire.

6. The Allies have engaged in a wide campaign of sabotage throughout France. Parachute troops are reported to have been dropped to aid underground forces. The in-

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formation as to results attained is insufficient to enable a report on results to be given.

7. The enemy has made daily attacks by air and light naval forces against the sea lines of supply to France.

8. In spite of the Allied air superiority, the German air force has occasionally intervened in direct support of ground troops.

9. The invasion of France is the occasion for the employment of two types of strategy. The inferior force depends on maneuver to ultimately win the war. The superior de-

pends on irresistible might. Maneuver is taught in our military schools. Strategy of the irresistible force is seldom taught in any country.

Theoretically, the irresistible force is bound to win. It is the most ancient form of warfare known. By no means has it always won. The irresistible force has frequently met disaster. Perhaps our schools should give instruction as to what the irresistible force needs to do to avoid being defeated.

"Big Bertha"

The following account of "Big Bertha," the huge German gun that shelled Paris from a distance of over seventy miles in World War I, appeared in a recent number of Neue Zürcher Zeitung, Zürich, Switzerland.—THE EDITOR.

THE secret of "Big Bertha" has now been extensively revealed. We give the following figures from the dependable data furnished by Muther:

	Original Gun	Rehored Gun
Caliber	21 cm	23.2 cm
Length of projectile (4.5 and 4.1 cal.)	95 cm	95 cm
Weight of projectile	105 kg	125 kg
Explosive charge	6.85 kg	8.7 kg
Propelling charge (nitroglycerine-powder)	195.5 kg	242 kg
Highest gas pressure	4200 At	4200 At
Muzzle velocity	1646 m/sec	1648 m/sec
Length of tube, rifled, in cal.	150	136
Range at 50 degrees firing angle	128 km max	114 km
Useful effectiveness (degree of effectiveness)	15.8%	15.2%

Higher than any body had as yet been driven by the hand of man, the projectile first rose to a height of forty kilometers above the surface of the earth, then, after a flight of 186 seconds, plunged down like a meteor onto its target.

The barrel of the cannon was thirty-five meters in length, the last six meters being without rifling and used only for the purpose of utilizing to a greater extent the powder energy. The entire length of 170 calibers was

almost double that of the infantry rifle measured with the same unit. The enormous propelling charge of 196 kilograms of dry gelatinized nitroglycerine powder had to be placed in an extra-spacious combustion chamber 3.1 meters in length. The powder weighed almost twice as much as the projectile, while normally, even in the case of the highest muzzle velocities attained by naval rifles (900 m/sec), the weight of the powder is scarcely a third of the weight of the projectile. With the unheard-of muzzle velocity of 1650 m/sec, the projectile attained its maximum range not with a firing angle of forty-five but of fifty degrees because in this way it reached the rarefied strata of the stratosphere sooner and was able to travel for a correspondingly longer period of time under conditions of reduced resistance (atmospheric pressure at a height of twenty kilometers is 1/20, and at thirty kilometers, 1/30 of normal). The pressure of the powder gases, which in the case of heavy guns goes as high as 2700 atmospheres, rose in this instance to 4200 atmospheres. Because of this, of the five guns that were in action one of them exploded. With every round the barrel was burned out and widened so that not only the powder charge but the caliber of each successive shell had to be somewhat increased. No wonder that the length of life of these long-range guns was extremely short, varying between fifty and eighty shots.

Some Fundamentals of Tank Employment

MAJOR E. J. FRUIN, *Cavalry*
Instructor, Command and General Staff School

ORIGINALLY the tank was designed as an antipersonnel weapon. Its armor enabled the fighting crew to be relatively immune to the deadly fire of the automatic weapons. The early tanks were definitely "thin-skinned," and for firepower they were limited to the machine gun. Therefore, it was not long before an effective defense against the tank was established. The artillery and antitank gun soon became weapons which the tank had to respect. Today we all know of the race that has taken place between the tank and the weapons built to destroy it, the result being that the present day tank has evolved into a more formidable vehicle with considerable armor protection and higher caliber weapons for additional firepower.

As a result of this evolution, many of us forget that the tank is still a weapon to be used primarily against personnel. Although we have the cannon on our tanks to enable them to punch their way through the enemy defense, their particular objective is still the hostile rear areas where they can create the maximum amount of destruction against enemy reserves, supply and communication installations, and higher headquarters.

Even though the tank is primarily an antipersonnel weapon, there will still be many times when it will be necessary to fight tanks against enemy tanks. This is especially true if we are weak in antitank means. But in so doing we must always attempt to make the enemy accept battle with our tanks on ground of our choice. In other words, we employ ambush tactics. To employ our tanks fashioned after the cavalry charge of days gone by is veritable suicide, for even though we may win, we lose severely in much-needed personnel and equipment.

With this brief amount of background, let us consider some of the more important fundamentals of tank employment. The principles of fire and movement, surprise, and mass are the three fundamental principles upon which all tank action must be based.

Other principles, such as thorough reconnaissance, adequate control, simplicity of plans, economy of force, coordination, and security, are also important; however, in this article we will consider primarily the first three mentioned, inasmuch as they are the ones most frequently violated at the greatest cost to men and matériel.

FIRE AND MOVEMENT

Fire and movement of tanks means that the movement of tanks in the attack must always be covered by other tanks, or by supporting weapons, firing from stationary positions. Most usually it involves movement to a flank while the enemy is fixed with fire from the front. As one officer stated, it is quite similar to the procedure that a veterinarian follows in treating a horse. If he has some work to do on the rear end of the horse, he is assured of far greater success and fewer ill effects if he first applies a twitch to the horse's nose.

Now, why is fire and movement an important fundamental in the employment of tanks? Actually it is a fundamental of all tactical employment, but for several reasons it is particularly necessary when employing tanks. First, fire from a moving tank is ineffective. Second, the tank presents an excellent target due to its size. Third, the dust caused by movement adds to the already limited visibility of the crew, making it difficult to pick up enemy targets. And finally, because of the dust and noise the crew may not even know of the presence of enemy fire until their tank receives a hit.

Let's read from a report written by a German tank battalion commander on our tactics. "The American tanks emerged from their concentration area at 4,000 meters and advanced fast. They opened fire at 3,000 meters, without effect (German tanks made use of cover afforded by ground). The attack gave the impression of indecision. Many American tanks did not realize, until too late, that they were being attacked from the flank;

this seems to have been due to poor visibility."

Whether these remarks are justified or not is unimportant, though it is highly possible that they are. The point is that we can learn from them.

"The American tanks . . . advanced fast." Let us analyze that. The tank has inherent mobility and we can be thankful that it has. We teach that movement from one bound to another must be rapid to gain security. However, speed in the attack can be a boomerang if carried too far. One general officer put it well when he said, "A false picture of speed and aggressiveness has been built up, which has unnecessarily cost lives and material, by units charging blindly into battle instead of working forward steadily, skillfully, and employing all means of reconnaissance and fire to cover the advance."

Another statement made by the German was that the attack gave the impression of indecision. How very true this may be when we fail to adhere to fire and movement tactics. We must move forward systematically, moving from one vantage point to another. We must always leave some supporting tanks or weapons in position to cover the movement. Our attack will then be decisive, and control, which is so difficult for tanks but nonetheless important, can be more easily attained.

There is still another criticism made by the German officer in his remarks. It implies that several tanks were surprised in the attack due to poor visibility. It is admitted that poor visibility is a limitation of the tank. We can't provide a lot of armor protection to our personnel without taking something from them. But by living up to the fundamental of fire and movement we can avoid to a large extent the unforgivable sin of being surprised.

MASS

The use of fire and movement does not preclude the application of the next fundamental. That is the employment of tanks in mass. It is the concentration of effort by all toward a common objective. We should not dissipate the power of our tanks on several insignifi-

cant targets over a broad front. Before going further it should be pointed out that certain factors may influence the application of this principle. The enemy situation and the terrain may prevent employment in mass.

Many well remember the way our armored division was employed in the early stages of the Tunisian campaign. Elements of the division arrived on the battlefield piecemeal and were committed to action piecemeal. Mass action was in fact precluded. These armored elements were the only forces available with sufficient mobility to meet the sudden thrusts of the enemy. They were used to plug several holes on a long and thinly held line. Although this initial employment was justified, reports make this statement: "The outstanding general lesson of the campaign was failure to use the armored division in sufficient strength or in concentrated mass." Successful employment of armor calls for striking in mass at the enemy soft spot. This rule applies whether the armor is on the general offensive or merely acting as the counterattacking force on the defensive. Dispersion of strength should be avoided.

Some situations where tanks are supporting infantry may call for the employment of tanks in small numbers or even individually. This, however, should only be done when the terrain does not permit effective employment in mass. On the offensive and when terrain permits, tanks are most effective when used in mass. On the defense again the action is most successful when the bulk of the tanks are held in mass ready to act offensively in the counterattack. There may be occasions in defensive operations when some tanks might be distributed to infantry regiments, battalions, and even lower units to bolster the antitank and artillery means should they be weak. But even then not at the expense of keeping a sizeable number in reserve for counterattack purposes. By using them to counterattack the flank of the enemy, their characteristics of mobility, firepower, and shock action enable them to inflict far greater damage to the enemy effort than if they were used in the defensive position as stationary weapons. We must consider that

their value lies not alone in firepower. Their mobility and shock action must be used advantageously. Let us repeat to give emphasis to our points with regard to tanks in support of infantry. When terrain permits, tanks should be used in mass. Their mission should be to operate in close coordination with the main effort.

In reading from the historical record of a tank battalion in Italy, it was noted that, with the exception of the first three days following the landing, the unit was not used in its entirety, that is, as a battalion, during the course of a month. It was attached at times to two infantry divisions. Tank companies and platoons were further broken up and attached to infantry regiments and battalions within those divisions. The tanks were distributed evenly without regard to terrain. They were in effect used as mobile pillboxes.

In this instance it is believed that the principle of mass was violated in part at least—it may have been partially justified by the existing circumstances. But to distribute tanks evenly without regard to terrain materially reduces their efficiency. Their characteristics of mobility, firepower, and shock action cannot be utilized to the fullest extent when so employed.

It has been reported that infantry troops like to see the tank around. It adds considerable to their morale. They have great confidence in its ability. However, it is a wasteful expenditure of equipment to disperse a few tanks to each small infantry unit when the terrain is such that the tank unit can be used in its entirety to assist the main effort. They can help the morale best by "knifing" through to take vital objectives which will cause the enemy to withdraw.

Let us consider this fundamental of mass further. We have stated that we don't commit tanks over a broad front on scattered objectives. Neither do we hold them concentrated in reserve, committing only small elements at a time. In other words, we do not send a boy to do a man's job, especially when a man is available.

To emphasize this, let us point again to

North Africa. In the early stages of the desert campaign there appeared to be a lack of understanding of this principle of mass employment of tanks. There were several occasions wherein the tank units were committed piecemeal, not because they were unavailable to the action, but apparently in an effort to economize on the use of the tank. It was true that tanks and their trained crews were not over-abundant at that time. The tactics employed only too often were to send up a tank battalion to break through the enemy defensive position, leaving the majority of the tanks in reserve. When the enemy had literally destroyed that unit, another was sent forward to breach the defense, and it generally met with an equal lack of success. The task for the defenders was simplified. They had an opportunity to destroy the opponent each time and prepare for the next attack. Whereas if an overwhelming number of tanks had been used, the pressure would have proven too great for the defensive means at hand. It is true there would be losses, but it was learned that it was false economy to commit small dribbles of tanks at a time. These tactics may have been carried over from the first World War. At that time it was advocated that a large proportion of the tanks be held in reserve so that continuous tank action could be effected. However, this rule was forced by the mechanical failure of the early tank, which set a limit to the time it could continue in operation.

SURPRISE

The third fundamental to be considered here is the one of surprise. It is equally important to successful tank action, but undoubtedly the most difficult to accomplish.

This is true for several reasons. The size of the tank makes it difficult to conceal during daylight movement. Even at night the enemy reconnaissance can pick up movement of tanks because of the noise they create. Many times the terrain will limit their movement to the main highways, thereby facilitating the work of enemy ground and air reconnaissance. In other types of terrain where it is possible to move across country, their

maneuver may be revealed by the dust created. In North Africa, for example, our tank units quickly learned to move very slowly to avoid raising dust clouds that would disclose the intended operation.

The element of surprise, though difficult, can be attained by tank units in many ways. Let us consider a few by citing examples.

During a recent field exercise one problem was set up with a reinforced infantry division on a delaying mission against a corps, including an armored division, on the offensive. The infantry division on the defensive took up successive positions each of which was made as strong as possible, both in the center and on the flanks, by natural obstacles. The particular phase applicable here occurred when the tanks of the armored division maneuvered and approached the rear and flank of the enemy over terrain cut by numerous ravines. Since the antitank defenses of the delaying force had been concentrated on the more likely approaches to their position, there was little to impede the tank attack other than terrain. As it happened, relatively few tanks were incapacitated by the terrain and the attack was completely successful. The commander of the infantry battalion on the flank learned the full meaning of the term surprise. He stated that he had dismissed the possibility of an attack from that direction. Thus we may accomplish surprise by attacking over seemingly impassable terrain or from an unexpected direction.

Surprise may be accomplished by special attention to counterintelligence measures; that is, by concealment and deceptive measures. At El Alamein the British were able to attain surprise by paying particular attention to deceptive measures. Although concealment of vehicles was a most difficult problem, they did conceal the identity of large numbers of tanks assembling for the attack by camouflaging them as trucks. While this was occurring, obvious preparations were made at other points along the front to invite the attention of the enemy. That is, patrolling was more vigorous, artillery fire was increased, and mines were removed. All of

these are stunts as old as war itself but they serve to put the defense off balance. The surprise was in no way complete, but by these measures the exact time and location of the attack was withheld. In other words, strategic surprise, which is rare, was out of the question, but tactical surprise was effected.

From the Russian tank engagements, there is one good example in particular where surprise played the decisive part. The element of surprise here resulted from great speed in concentration for the execution of the attack.

A reinforced tank regiment had the mission of taking a small inhabited place. The plan called for approaching the objective under the cover provided along a railroad line. However, after advancing some distance it was necessary to abandon the original plan because of narrow, deep cuts abutting the railroad. Reconnaissance disclosed numerous antitank guns along the only other approach, a highway to the right. The commander quickly determined that the infantry of his command would continue along the railroad while the tanks moved to attack along the highway where terrain was favorable. Because the Germans were apparently unaware of the approaching tanks, the commander determined to utilize the best terrain and attack into the antitank defense. He hoped to paralyze the action of the German guns by suddenness and speed. The quickly executed attack actually did produce results. Rushing at full speed along the highway, the tanks at once crushed the antitank guns, causing their crews to flee in disorder. Later by co-ordinated action with the infantry the tanks easily took the objective.

There is today a definite defense against the tank. If the enemy has time to prepare for the tank attack, he has a good opportunity to cause the attack to fail because of the superior effect of the antitank gun and the mine. Every effort should be made to commit the tanks with the maximum of surprise.

RECONNAISSANCE AND CONTROL

In the foregoing paragraphs little has been said about the need for thorough recon-

naissance and effective control in the employment of tanks. No discussion on tank employment would be complete without at least pointing to their importance. The criterion should be—move the tanks *not a single foot* without reconnaissance. Although control is difficult for even the smallest tank unit commander, it too is of the utmost necessity to success. The commander must always have control if he is to adhere to the fundamentals of fire and movement, mass, and surprise.

Seldom in combat are we able to apply a fundamental exactly the same way twice. For example, in Russia speed in the tank at-

tack may be the keynote in attaining surprise, but in the African desert tank units relying upon speed for surprise would fail because of the resulting dust clouds and open terrain.

Someone has said that rules are only made to be broken. It is admitted that many situations do call for a variance with the principles prescribed. While these fundamentals may not be obtainable in every situation, they *must always* be considered in light of the terrain, the enemy, and the resources at hand. Far greater success with tanks will be obtained by the commander who so operates.

Signal Activities of a Division in Combat

THE official report rendered by the Signal Officer of the 34th Division, covering the period of operations in Tunisia from 9 February 1943 to 14 May 1943, includes the following summary of facts and figures compiled by the Division Signal Section:

Message Center Section.—"Motor messengers of the division traveled 85,618 miles. Division message centers handled 37,684 messages, the peak load for one day being 1,136. Since a mail pouch of publications or a roll of maps counted as a single message, the bulk handled was quite enormous. During the El Ala phase the division was operating five message centers at one time."

Construction and Wire Sections.—"A total of 4,055 miles of field wire was laid by the division during the operation. The maximum amount of wire in use at any one time was 432 miles. The job of the wire teams had only begun when the system had been installed. From then on it was a tremendous job to keep the lines functioning. Artillery fire and the thousands of vehicles and tanks operating along the roads were a constant source of trouble. All wire laid was later recovered except the net left in the Tichon-El Ala area when we withdrew. However, after the operation our wire teams picked up much wire left by other units, and as a re-

sult fully as much wire was picked up as was laid out. Undoubtedly the most difficult job in our communications was performed by the wire teams."

Telephone and Telegraph Sections.—"Since telephones were our prime means of communication, their importance cannot be over-emphasized. The telephone system installed was colossal. At one time we had sixty-four switchboards in the division net, with a total of 458 telephones in use. Teletype communication was maintained at all times with higher headquarters, and much traffic was handled by this means."

Radio Sections.—"Radio was used to great advantage many times when wire communication failed or where wire was not available. Thirty-nine different radio nets were in operation simultaneously, involving 311 radios."

Attached Units Swell the Total.—"The foregoing figures have included only installations of the organic units of the division. At Fondouk Gap, where we had our largest number of attached units, the installations of the division, reinforced, included 532 miles of wire, 116 switchboards, 652 telephones, seventy-six radio nets, 583 radios, and a total of thirty-six officers and 1,409 enlisted men engaged in communications work."

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Maintenance from a Command Standpoint

LIEUTENANT COLONEL ROBERT S. DEMITZ, *Cavalry*
Instructor, Command and General Staff School

MANY of us have often wondered where to go and whom to see in order to learn briefly and informally what to do about *maintenance* in armored or mechanized units. All of us who have tried to talk this topic over with a recognized authority on the subject have usually ended up by being confused by the multitude of technical terms and details that were hurled at us; with all due respect to the good intentions of the average maintenance adviser it may be said that we have found an hour's conference with him places us in a haze of details—and we are very glad to execute a timely and courteous withdrawal from his presence. This discussion has one object; that is, simply to point out the fact that good maintenance is not necessarily found in the unit, be it company or division or corps, that is commanded by a maintenance expert. It can be shown that the old principle of the *chain of command* applies in this matter just as much as it does in any other.

A great deal has been said about the four prime factors of maintenance—*parts, tools, skill, and time*. Many commanders of battalions and regiments within divisions have been subjected to long moments of extreme embarrassment as a result of discovery by higher authority of an evident lack of understanding of the fundamental factors just mentioned—and for the accompanying failure

amount of discussion; no one could possibly hope to read it all, and certainly no one could possibly hope to become master of the contents of such a volume in his attempts to become a unit commander who thoroughly understands maintenance. Lost within these volumes lie frequent references to *command channels*—these references contain most of the answers to our maintenance problems.

Why is it that the mechanically minded American public of the armed forces suffer these recurrent little pains that come as a result of poor maintenance? Is this maintenance that we talk about—and are scolded for so much—really as bad as we are given to understand? If that is so, whose fault is it?

We may be a mechanically minded people, but many a mechanical wizard is too lazy to get out and *check* his vehicle during a long march. Our maintenance, from statistical records, is only fair; it certainly can stand improvement. Whose fault is it? The person responsible for maintenance in *any* unit is—*everybody*—because everybody has some maintenance task to perform, and he is directly responsible to his immediate superior for its accomplishment.

What, then, are the proper channels of maintenance responsibility? Many of our commanders sincerely believe that those channels should look something like Figure 1.

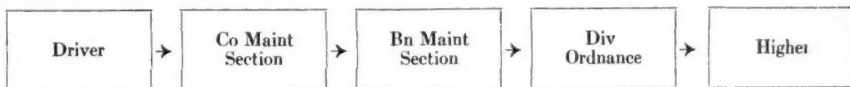


FIGURE 1.

to apply, systematically, a maintenance program that provides good maintenance of all vehicles and other equipment within the unit. Lengthy discourses have been prepared and published with an apparent intent to clarify the subject of *maintenance* for all concerned. This material, if ever consolidated under a single cover, would present an amazing

With the above picture in mind most of us simply decide to continue to punish the "responsible persons" until fear of further punishment brings about an improvement. Hazy and uncertain groping for the true answer, or in other words, belief in something similar to the above diagram, is one of our great shortcomings. We are *all* in that pic-

ture and it should look something like Figure 2.

This is different, is it not? Why punish your ordnance officer? He is not commanding your battalions. Why demand that your battalion motor officer answer for your troubles? He does not have a thing to do with commanding your companies. Are you going to

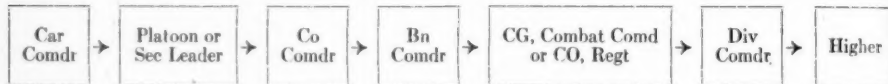


FIGURE 2.

provide yourself with a new company motor sergeant now that you have emerged from an inspection with the poorest maintenance rating in the whole battalion? Perhaps you will, but he is not the cause of your discomfiture; as a matter of fact, he doubtlessly tries hard for you—but he has no jurisdiction over those platoon leaders of yours. To go a pace further, do you expect your company motor personnel to step in and take charge of the maintenance efforts of your car crews? They can try, but that is an awfully haphazard manner to have things running in your company, and it certainly does reflect sorely on your own understanding of what we have known for a hundred or so years as the *chain of command*!

Spare parts cause lots of trouble—they are hard to get. No one, much less you, would be able to have really faultless maintenance with all of the rush going on that seems to be buzzing around you daily. To go further, you are not a mechanic yourself; how are you going to anticipate all of these items that seem to be creating bumps along your unit's road to excellence? What do your motor personnel do, anyway, if they cannot carry the burden for you? You have motor personnel to advise you; they make inspections for you; they do certain maintenance within your unit. *Use them.* Get their recommendations for corrective training, and then *you* put the emphasis and personality behind things, and you and your skilled advisers check to see what is being done to comply. Remember, no one has said that you have to do all of this

yourself. You cannot. *Everybody* is responsible; it is *your* job to make *everybody* feel that responsibility so strongly that *everybody* does something about it.

Parts are hard to get, or so it seems when your own unit needs them. If higher authority cannot supply you, you cannot help it. You certainly have failed, though, if your

motor personnel are indolent enough to "wait until tomorrow" before deciding to order a new part; and if they wait another day before delivering the requisition; and again, if they are not aggressive in *following up* that order through the proper channels. If your personnel are failing you in this manner, a week will be consumed in securing parts that were actually waiting on the ordnance shelves at the time your car crew first reported the trouble. Your motor personnel are *responsible to you* that this does not occur. What if the part simply cannot be had for some time? It has just been said that you are not to blame, in that case. That is certainly true. Where your own personnel will fall down here, however, is in the care of the deadlined vehicle while it is not in use. If the crew of that vehicle is not required to make a point of going over it thoroughly once a day just as though it were in use, you will be disagreeably surprised when your eye happens to fall upon it. You will, of course, initiate corrective action at that time, but it may be *too late*, in more ways than one! You had better have a system worked up to care for such vehicles while they are not in operation. That is just one more way to avoid those eleventh hour spasms of maintenance that are so embarrassing and so trying to the entire command.

Suppose we work out a little exercise, for the sake of illustration. You are the battalion commander of a tank battalion; your unit has just stopped for a ten-minute halt; what should take place within your bat-

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talion? Let us start at the bottom. Each crew, not just the driver, of each vehicle of the whole battalion, dismounts and checks its vehicle. Who is responsible for initiating this? *The car commander.* Who is responsible that each crew within the platoon does this properly and carefully? *The platoon leader.* Who supervises? *The company commander,* or his second in command. What reports are involved? Each responsible person should report results of check to the next higher such person. Is the idea, then, that platoon leaders simply take the report and pass it on, since they cannot inspect each vehicle personally? No! Any platoon leader with even slight experience can tell whether or not his crews are on the job, aggressively seeking the true status of the vehicles concerned. Now let us carry the picture to the end of the march; what happens then? The same thing happens, except that a much more detailed check must take place. When, exactly, does it happen? *At the end of the march*—not after troops are fed, not after a rest, but as soon as each vehicle is in the position in which it is to remain. Your men are tired? They will be far worse off if your unit is called out unexpectedly in a few hours, and you have several vehicle failures when you are under fire. It is too late then.

Most of us think that in the actual fog of war we cannot be expected to jump out and inspect vehicles all of the time. This is one of the big reasons why we do so much of this motor training. If you would like that you can disregard maintenance when in combat, just wait awhile and see for yourself. Better by far than that, ask the man who has been there.

Perhaps at this point you are tempted to decide that we are evading the issue. What are the details involved in achieving a clean maintenance record? You would like to know, item for item, just what to do! Let us leave that to your own motor personnel; the spoken word is certainly better than the written word of a stranger. *Suffice to say this:* you do not have to be an expert on motors; be *interested* in this phase of your military responsibility—learn enough about it to be able

to converse with your subordinates with a degree of understanding; then—put yourself behind the matter wholeheartedly just as you do in matters of individual shooting scores, and so on; *push—check up—hold the right persons responsible to you*—insist on the results that you want, and you will get them.

The *ability* of your personnel is taken for granted. But—how energetic is your motor officer and how energetic are his subordinate shops in the all-important matter of ordering parts? If you are a battalion motor officer, ask yourself this: does my parts section receive an order *within a minimum of time* of the company's discovery that the part is needed? If that is not the case, you had better see the company commander concerned about quicker action from his shop. If that does not work, take it to the battalion commander; you are *cheating him* if you do not. What about *you*? Is your own shop so organized that personnel from subordinate organizations are received courteously and given *prompt* service? Is your establishment always *too busy*, so that no one from outside can find out exactly where to go for each type of service that you render? Do you allow parts orders to accumulate until you have a sizeable stack before you order from the higher echelon? Do you do the same thing in regard to actual repairs that your shop must perform? Does some one from your own shop *check* carefully the work that you do before it goes back to the company? Do your personnel set themselves up as noncommittal geniuses, or try to make your "customers" feel stupid by professing to be amazed that the visitor does not know exactly where to go or whom to see for the securing of certain information or service? If you have the wrong answer to any of those questions, get yourself a new design for living, and do the same for the persons directly under your command; you are letting your commander down in a lot of little ways that will not stay under cover very long. Try this sometime soon; find several parts in your bins that you know cannot be pulled out of stock from memory. Order them yourself at the counter and see how long it takes. If

your parts man is a good one (and he can be good if he tries hard and *thinks*) he will get bin locations from the stock cards and hand the items to you in a few seconds. On the other hand, if things have been drifting along haphazardly, he will not even be able to find records that show that the parts are in stock, and he probably could not locate them for you in a week. *That is where lots of your deadline originates*—and needlessly at that, of course.

The same story that applied to the battalion motor officer and his shop will fit equally well into the division shops. *Everybody* must be on his toes in this matter of maintenance, and it is the *chain of command* that must be utilized to keep things moving.

A few words about random motor inspections—about the spot-checking of vehicles by crews operating under division control. We cannot give *everything* a complete check each time it goes out! We do not have

to. To begin with, the company shop should have checked the vehicle not so long ago—if the check was a careful one, all of those items should be perfect. Your driver should have done his part just before pulling out; if he slurred through that, there is the danger. *Over ninety percent of the items reported as discrepancies on spot checks never would have been found faulty if the driver had done his job before leaving the park.* Naturally, anyone likes to rush through the proper check, or not do it at all. That is, he can cause you this trouble if you let him do so; if you demand *system* it cannot happen.

Certainly all of us realize that there is a time for everything, and a place for it as well. If we are to get along at all with this business of maintenance, it may pay to consider this: there is a time for it, and there is a place—

THE TIME IS RIGHT NOW.
THE PLACE IS RIGHT HERE.

Highest Muzzle Velocity Ever Attained

Translated at the Command and General Staff School from a German article in *Neue Zürcher Zeitung*, Zürich, Switzerland.

THE highest speed at which a projectile was ever fired, 2,790 meters per second, was attained and measured in Berlin in 1938 by H. Langweiler. As experimental weapon, Langweiler used an 8-mm gas-pressure measurer with a one-meter barrel, corresponding to a length of 125 calibers. Its strong construction, after the combustion chamber had been enlarged to five times its original capacity, permitted of the employment of no less than eleven grams of propelling powder. He chose a regular nitro-cellulose flake powder of 950 kcal/kg [kilocalories per kilogram], whose combustion rate had been increased to a maximum by a surface treatment. In all the trials a constant quantity of eleven grams of powder was used while the weight of the bullet was steadily reduced from an initial

weight of 12.85 grams. In this manner, with a bullet weighing 3.1 grams he was able to attain a velocity of 2,000 meters per second and finally, with a bullet weighing but .25 grams, corresponding to a propelling charge weighing forty-four times more, he was able to attain the highest muzzle velocity of 2,790 meters per second with a powder gas pressure of 12,000 atmospheres. A normal weapon would be blown up instantly by such pressure, but since the experimental barrel was unusually strong (a few shots were fired and the innermost layers of the steel barrel which were deformed by the firing found sufficient support in the outer, unaffected layers) the steel held up under the strain. That such records within the limits of infantry calibers cannot be transferred to heavy cannon, is self-evident.

Jungle Warfare

"Before the infantrymen can overcome the enemy they must overcome the jungle."

Digested at the Command and General Staff School from an article in
The Marine Corps Gazette June 1944.

This article has been compiled by the Marine Corps Schools, Quantico, Virginia, and is "based on the experiences of many Marines of all ranks who have fought in the jungles of the Philippines, Guadalcanal, New Georgia, Bougainville, Choseul, and New Britain."

WHILE operating in coastal regions of a tropical island, several sorts of terrain and vegetation will be encountered. There are cultivated areas largely given over to coconut plantations. These generally have a few fair coral tracks running through them. The tracks are of crushed coral and are from six to eight feet wide. Movement and visibility in the plantations are normal. The fronds of the trees give partial concealment from air observers. Airfields are easy to construct on the site of coconut groves for the ground is quite flat. (Henderson and several other fields on Guadalcanal as well as Munda on New Georgia were formerly small parts of large coconut plantations.)

The coastal shores, the lagoons, and the inlets are often fringed to varying depths inland with dense mangrove, the roots of which are covered at high tide. The twisting roots, the mud, the coral outcroppings, and the maze of low branches make such areas very difficult and dangerous to traverse. Landing against a mangrove shore with personnel boats is not a feasible undertaking for large forces. Even if it were, it would be most difficult for units to get through the mangrove and still retain any semblance of order or the ability to fight as organizations.

Inland from the mangrove swamps, the coconut groves, and the stretches of jungle that fringe the coast line, there are often found, before the foothills are reached, relatively level meadows of kunai grass. This is a strong, coarse, thick grass that may be anywhere from three to nine feet in height. While crossing a patch of kunai grass pro-

gress is slow and laborious, and movements of the grass betray one's presence to enemy air observers or to enemy observers perched in trees at the edge of the jungle surrounding the grassy areas. Passage across kunai fields in the daylight is always to be avoided.

As one progresses still farther inland he finds precipitous razor-backed coral or volcanic ridges, sparsely covered with vegetation, rising toward the mountains. Because of the precarious footing, these ridges are difficult to negotiate. They offer neither cover nor concealment.

The three types of growth mentioned cover the smaller part of a jungle island. The remainder of the island will usually be covered with a very heavy jungle growth in which there will be found vegetation of all types and trees of all sizes. When the growth permits light to get through, tangle of bush will be impenetrable, and cutting will be necessary off trails or tracks. The growth is particularly heavy in valleys and tends to thin out as the elevation increases. This is uncut, virgin, or primary jungle. In some places, the trees may reach heights of eighty, ninety, or one hundred feet or more, and a complete leaf canopy prevents the sun from striking the ground. This is "rain forest." The undergrowth is thin, and an ordinary hunting knife will suffice to cut the occasional vines and creepers that may be in the way.

Frequently in the jungle there are large swampy areas, and the low-lying ground is always muddy. The swamps may be from ankle to thigh deep. Usually they are about knee deep, and the mud is very heavy and thick.

If a patrol were to cover a march through the types of terrain that have been described, it might start with an hour of easy going along a smooth coral track that runs through a coconut grove. After passing through the

coconut grove, the patrol might be required to go inland for some distance. Perhaps for half an hour the patrol forces its way through kunai grass that is over the heads of the men; it then climbs one or two precipitous and slippery coral ridges that lie across its route; next, it descends into a jungle—a solid wall of undergrowth, vines, and creepers. (All jungle vines have one attribute in common—nature has equipped them with thorns that tear the skin and rip the clothes.) Perhaps it takes an hour to cut through three hundred yards of this. Next the patrol comes to a swamp about five hundred yards in width and from calf to knee deep; after negotiating this muck comes a short tour of about half a mile through the mangroves that border the lagoon which is the patrol's destination. The patrol may cover three and one-half miles in five hours. The first two and one-half miles of the distance were probably done in about an hour over the coral track. Consequently, for the last four hours of its trip the patrol has averaged no better than a quarter of a mile an hour.

During its march the patrol has not been moving through atmosphere that is air conditioned. It may have started out in the morning under a hot sun blazing in a perfectly clear sky, but it will in all likelihood march the last half hour toward its destination in a torrential downpour.

It should be obvious from this brief description that terrain and weather are determining factors in jungle warfare. They combine to limit the movement of foot troops and to make the movement of tracked and wheeled vehicles impossible except on roads and tracks.

THE EFFECT OF THE JUNGLE ON OPERATIONS

All movement in the jungle is calculated in terms of time rather than distance. The problem is how long it will take to get from "A" to "B" rather than how many miles it is between those places. Mileage is purely an academic consideration.

Because of poor trails or the complete lack of them, difficult terrain, and mud, the movement of troops on foot is slow. Generally

there can be no movement of tracked or wheeled vehicles larger than the quarter-ton truck until the engineers have improved tracks and trails.

Flank security elements cannot be expected to maintain a normal rate of march when operating off trails in thick jungle. They will be required to cut, and will not be able to keep pace with elements moving on a trail. When flank security is essential (as it is when contact is probable) the security groups will have to cut continuously. They can expect an average progress of about a quarter of a mile an hour. The position and rate of advance of flank groups can be determined by the noise of their cutting or by periodically sending out small patrols to contact them. The necessity for frequent relief of flank security detachments will occasion frequent halts.

Supporting weapons and their ammunition cannot be moved over jungle trails at the same speed as that at which ground troops move. If artillery is required to move over trails to support jungle operations, the speed of troop movement must conform to the speed at which artillery can be manhandled or packed; otherwise the foot columns will soon leave this supporting weapon far to the rear.

The movement of tanks is seldom possible in heavy jungle unless they can move over prepared routes. They may be used to advantage where terrain permits their free movement. Normally they are restricted to coconut groves, beaches, grass-covered fields, tracks, or improved trails. When operating under these conditions they are vulnerable targets for well organized antitank defenses. When tanks are used, they must be closely supported by foot troops to protect them from enemy tank destroyer parties.

Primary sources of supply may be by air drop, by Marine carrying parties, or by boat or canoe. These means may also have to be used in the evacuation of our wounded. All of them have been used in the past very satisfactorily.

The efficiency of the air arm in direct support of ground troops is strictly curtailed. The complete leaf canopy prevents pilots from

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seeing troops on the ground; the troops are often unable to catch more than fleeting glimpses of the planes. Pilots cannot see panels laid out on the ground; it is often impossible for them to see panels or strips displayed in the tops of trees. Colored smoke pots placed on the ground have been used to indicate the position of ground troops but the rapid diffusion of the smoke renders them impractical. Smoke pots or smoke grenades to which lines are attached may be thrown into trees. There is now available a "tree top" smoke grenade which is believed to be satisfactory.

Artillery in support of ground troops is seriously handicapped by lack of observation. In the jungle the artillery habitually uses forward observers to control supporting fires. The forward observer teams conduct fire from most advanced positions. They may be in trees or prone on the ground. They sometimes are unable to see the bursts. In such a situation they control the fire by sound spotting or sensing; that is, they bring the impact area to the target area by sound. Sound sensing is an expedient. When registration by high burst, WP, or other visual means is possible, these means are preferable. Artillery can and does fire unobserved fires from maps or air photos. Artillery, firing unobserved fires, the data for which was based on maps or photo maps, rendered effective support on several occasions on Guadalcanal.

The fire of heavy mortars is controlled in a manner similar to that described for the artillery.

Light mortars will always be used provided there is a gap in the canopy overhead. If there is no gap and one cannot be cut, it may have to be created by firing into the canopy using super-quick fuze. This is exceedingly dangerous to our own personnel, but it has been done in cases of emergency.

Parallel movement of the various elements of a command in thick jungle is most difficult. Parallel trails with occasional lateral connecting trails do not exist.

A jungle march from point to point will in almost every instance be made over a single trail in a column of files. Runners are the most

practical means of communication, but it is a real task for a runner to get from the middle of a moving column to its head.

It is no particular problem for a runner to move two hundred yards over the type of ground and through the type of vegetation that we have in this country, or that is generally found in Europe, North Africa, or China. It might easily take the runner a quarter of an hour to cover this distance over a slippery, narrow trail in the jungle.

Map reconnaissance should precede a movement in a jungle area—if maps are available. In the Solomons no accurate detailed maps were available. We may hope for fairly accurate maps in the future when we operate in other areas. To state that a map reconnaissance precedes a jungle operation is misleading when no accurate maps are to be had.

Reconnaissance by air photos including mosaics and strips is valuable in that such natural features as rivers, lagoons, inlets, off-shore coral formations, and such works of man as coconut plantations, native gardens, and villages are clearly delineated on them. Vertical photos, however, will not reveal terrain details hidden by a solid jungle canopy. Obliques will reveal the contours of the ground though not to scale and with considerable distortion. The most indispensable types of air photos are stereo-pairs and vectographs, and valuable information of the terrain and ground forms can be gained from a study of them. Engineers are now equipped to make vectographs.

Ground reconnaissance should, when possible, precede an attack in the jungle. If scouts are properly trained, this is feasible. The extent of the enemy position must be determined before an attack can be launched against it.

It will not always (in fact, it will rarely) be possible to determine the nature of his defenses, that is, the state of their development, but the extent of his defensive area can usually be determined. This requires constant, alert, intelligent, and aggressive patrolling. Patrolling must be continuous, for the enemy is quite as capable of making daily changes

in his dispositions as we are. In most cases, his day and night positions are not identical, except where defenses are highly developed as at Buna or Munda.

THE NATURE OF JUNGLE WARFARE

There are no "blitz" campaigns in the jungle. The pattern of jungle fighting is one of many small combats in which groups, squads, parts of squads, automatic weapons, teams, and platoons strive to eject the enemy from his positions.

Battalion, regimental, and division commanders, because of lack of observation, difficulty of movement, and far from perfect communications, cannot retain close control of an action. Jungle warfare demands the highest qualities of leadership of all officers and noncommissioned officers. Leaders must be aggressive and resourceful. The quality of initiative is at its highest premium in the jungle. This is particularly applicable to the leaders of small units, of platoons, of squads, and of groups within squads.

Except when units are acting independently, supporting artillery with forward observer parties to control fire will assist in the attack, as will heavy mortars. It may be necessary to hold up an attack until artillery and heavy mortars can be registered. This will be done when artillery support is essential as in the reduction of a system of enemy bunkers or pillboxes, with which small infantry units cannot cope with their organic weapons. Artillery and mortars are "man savers," but in order to profit from the effect of their fires troops must be trained to close with the enemy immediately after barrages have lifted. If there is a delay in the assault, the enemy will have time to recover from the shock of the high-explosive bombardment and will be able to man his automatic weapons effectively.

Opportunities to use tanks in jungle country will be comparatively rare. In one jungle operation the type and organization of the enemy defensive system was such that tanks proved to be the only effective means of getting at the pillboxes to destroy them. Roads were cut and corduroyed by engineers pro-

tected by ground troops, and tanks were moved up as closely as possible to the front lines before the attack. When the time factor permits preparation of roads by the engineers, tanks can be used. The necessity for close support must be constantly stressed.

Since pilots are unable to see through a jungle canopy, aircraft are unable to realize their full potential in close support of attacking ground troops in the jungle. Aircraft can and do carry out preparatory bombing and strafing missions, but because it is difficult to indicate a spot jungle target to the pilot by signal or to describe it to him by radio, he can do no better in most cases than to bomb an area. Area bombing can be controlled and the safety of our own troops assured by the establishment of daily bomb lines. This type of bombing is effective provided the area is not too large and the concentration of high explosive can be made heavy. Located ground targets can be pointed out to aircraft by the use of smoke shells fired by the artillery or by mortars.

It is not often that the 37-mm gun (a direct fire weapon) can be used to assist the attack. To manhandle this gun into a position from which it can fire effectively on enemy bunkers or pillboxes requires in almost every instance the exposure of the gun and the crew. The gun is not sufficiently mobile for the infantry to move it along with them. For these reasons its use is limited in attack situations. In the defense, firing canister ammunition, it is indispensable.

Jungle combat consists essentially of the coordinated action of small groups of infantry armed with the weapons they are able to carry on their backs. Once they engage in close combat, conditions will not permit them to receive much help from heavy supporting weapons.

TRAINING FOR JUNGLE COMBAT

To be prepared for jungle fighting, the Marine must be trained technically, tactically, and mentally. His nervous system must be prepared for the shocks it will receive in the jungle.

It is essential that he know how to fuze and

cap high explosive charges and how to apply them.

Instruction must be given in the use of fragmentation, smoke, and thermite grenades. All personnel must be trained to throw hand grenades accurately. After initial instruction, all throwing practice must be carried out in uneven and wooded terrain with men throwing from behind logs and stumps and from foxholes and trenches. The essential requirement is accuracy; distance is secondary.

The necessity for conservation of ammunition in battle must be stressed in training. It becomes second nature to a man to use ammunition wisely. Fire team and squad leaders must constantly be alert and control fires during training exercises. The exercise of rigid fire discipline will be essential in action and must be emphasized in training.

A minimum of three men per squad (one per team) should be qualified flamethrower operators.

Jungle combat often requires quick shooting, as targets will normally be visible for only a second or two at the most. Men must have training in getting their pieces to the shoulder rapidly to fire from an off-hand kneeling or prone position.

All troops must be trained to use enemy rifles, light machine guns, heavy machine guns, light mortars, and hand grenades. It is particularly important that men hear both the light and heavy machine guns fired. These two guns (particularly the light) are the framework of Japanese defensive positions. If the men can hear these guns fired they will learn to recognize them by their sounds and their cyclic rates and to distinguish them from our own.

Enemy antitank and antipersonnel mines and common booby traps should be shown and demonstrated.

Automatic riflemen and machine gunners must realize that in attack they may have concealment but will have little cover. Therefore, they cannot hope to remain in the same position to fire more than two or three bursts. Machine-gun crews must learn to move their weapons to an alternate position in a matter

of a few seconds. Automatic riflemen must learn how to move quickly from one position to another.

In the defense, the weapons must be placed so as to lay down bands of fire across the front of units to the right or left. Generally, machine guns and automatic rifles should be placed low to cover most likely avenues of approach, but some automatic rifles should be placed in trees.

Continuous emphasis must be placed on physical conditioning. Officers and men must follow a strict regime designed to increase stamina.

Men must be trained to be alert, to think, to act. They must have it constantly drummed into them that when they are confronted with a battlefield situation there is nothing worse than to do nothing. The Jap has demonstrated repeatedly that he is at a serious disadvantage when confronted by an opponent who thinks and acts quickly.

Cultivation of the senses of sight and hearing is a part of mental training. In all training the cultivation of perception must be stressed. Because visibility in the jungle is low, a man must often primarily depend on his senses of hearing and smell rather than on his eyes.

Marines must be taught the necessity for silence. Many, many Marines are dead today because they talked when they should have been listening.

The jungle (without the added complication of an enemy who is there for the particular purpose of killing Americans and our Allies) is forbidding to those whose acquaintance with it has been restricted to public parks. A night spent in the woods in a foxhole under conditions of complete blackout is a new experience to most men. Psychological preparation for the jungle should include training under such conditions in thick or wooded country.

During field training, men should be required to carry their arms with them at all times; while they are in the chow lines, while they are attending sick call, and when they are called before the commanding officer. This helps develop the idea that the weapon

is part of the man and belongs to him as much as his arms or legs do.

The quality of patience must be developed. It is a quality that is necessary in jungle warfare, and men can be trained to be patient. This quality should distinguish scouts, snipers, sniper-stalkers, and personnel assigned to intelligence duties. These people will often find themselves in positions where if they are patient they will be richly rewarded but where, if they become fretful and impetuous, they may forfeit their own lives as well as many of their comrades.

Proper use of the automatic weapons in the teams within the squad must be stressed.

The conception that he is a member of a team must be developed in every member of the squad.

The squad should be instructed how to act in the advance guard, in the rear guard, as a combat patrol, as a flank patrol, and as a reconnaissance patrol. It should be taught how to set an ambush and what to do if it is caught in an ambush.

Defense groupings must be explained, the

various possible patterns pointed out, and the squad required to assume the defensive by day and night. The value of active defense in jungle combat must be emphasized.

Individuals and units cannot be expected to conduct themselves properly in the jungle at night unless they have been trained at night. In thick jungle, it is impossible to move for any distance at night unless the movement is over a trail or a marked route. It is extremely doubtful if even the natives could move through thick jungle at night, and reports that the Japanese are able to do so are not true. Japanese training doctrines, while they stress the importance of night attacks, recognize that movement of large bodies of men through the jungle at night is not possible. The Japanese have been able to move at night because they have done so over trails and routes which have been reconnoitered and marked in the daytime.

The operation of crew-served weapons must be practiced at night until personnel develop the ability to handle their weapons and ammunition with ease in darkness.

Tank Trends

From an article in *The Tank* (Great Britain) March 1944,
reprinted from *The Tank* (Canada).

THE effort is being made to improve the tank in three directions—mobility, fire power, and protection—and these to some extent are not complementary, but contradictory. Increased fire power involves some sacrifices in mobility, and greater protection is gained at the expense of both fire power and mobility. On the other hand, a high degree of mobility is inconsistent with overwhelming gun power and effective all-round protection. It is only by new inventions—lighter and more powerful engines, new guns to fire heavier projectiles with a higher muzzle velocity, with little increase in weight—that tank development is prevented from degenerating into a vicious circle. The Germans, the Russians, and the Americans have sought to a

greater extent than the British to combine in one general-purpose tank the greatest common measure of these three conflicting essentials. The Americans have been especially successful; the Sherman tank is probably the best general tank in use in any army.

The British have gone in for different tanks for different purposes. Those with speed and long-range antitank guns are quite different from infantry tanks, which feature a high degree of protection and effective antipersonnel guns. At the same time there has been a corresponding development in antitank guns, and these, mounted on self-propelled carriages, are part of equipment of armies today.

The Air OP of the Armored Artillery

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NOTHING need be said in support of the artillery observation airplane. Its combat record to date speaks for itself. The argument of its vulnerability was promptly disproved in the first operation. Our two planes performed all necessary observation and flank reconnaissance in the face of almost hourly enemy air attacks. The name was changed by the troops to "Maytag Messerschmitt." More trouble was experienced in keeping air observers on our side of the front than in getting them to agree to go close enough to observe. The details of a reconnaissance flight twenty-five miles into enemy territory will be disclosed later.

The — Armored Division, less Combat Command B, was in an assembly position near Constantine, Algeria, when we arrived with the first Cub planes. We had flown up from Oran and had several exciting experiences flying through some of the mountain passes. Many of the mountain ranges were higher than the ceiling of our planes, not to mention the expected gusty air currents.

There were eight planes in our division, two with each battalion and two with division artillery headquarters. I was assigned to a field artillery battalion.

We had the planes, pilots, and mechanics but no spare parts. Spare parts are a necessity, for planes operating under combat conditions will be subjected to much more damage than those operating under non-combat conditions. The planes were promptly fitted with SCR-509 radios obtained from the artillery battalions and all possible maintenance was performed to ready them for combat. We were held under division artillery control and flew as a group to the Tebessa airport after our column arrived at Bou Chebka, some thirty miles east of Tebessa. We went into a concealed bivouac, and after a few days a short landing strip was cleared in an open area near headquarters battery. My plane and ground crews then joined the battalion for the first time. A halftrack was provided for ground crew and equipment transporta-

tion. Under these conditions there was no chance to acquaint observers with adjusting fire from the air and very little time to get acquainted with the personnel of the battalion. The Division Air Officer established a salvage replacement parts pool. We had nothing to put into it at the time, but later



it grew and proved to be a great aid in keeping the planes in operation. He also prepared a weekly instruction memorandum to which later were added lessons learned in combat by all three battalions. Since the battalions were separated most of the time during the early stages of the campaign, this memorandum was a useful medium for the exchange of information.

The battalion was alerted as part of Combat Command "D" for an operation against Station de Sened, ninety-two road miles to the southeast. The plan was to march on the night of D-1 to Feriana and the next night through Gafsa on to Station de Sened. The problem of getting the planes to the proper

place at the proper time without having them come under air attack was worked out in detail. This problem is always present in operations involving an approach march when friendly air superiority is lacking. Enemy air was very active along the road, and it was therefore decided that from Feriana the planes would cut cross-country, flying very low, and meet the battalion on the Gafsa-Sened road. The flight was to be made as soon after daylight on D-day as possible. As it actually worked out, D-day was postponed two days and we met the battalion at Gafsa. This emphasized the necessity for maintaining communication with the battalion at all times because of such contingencies as changed orders. This was impossible with the short-range SCR-509 in the planes, but by keeping the planes near or in communication with combat trains, communication could be maintained.

The combat command marched out of an assembly position east of Gafsa at daylight. Our complete air section was with headquarters battery. We were not needed that day because of the slow-developing situation and due to the fact that ground observation was excellent from a mountain range on our left flank. That night we were still with headquarters battery, and it was here we learned a very important lesson. After dark the battalion was ordered to take up a position about a mile to the rear. As it is impossible to move planes after dark over rough terrain without removing the wings and transporting them on 2½-ton trucks, our air section spent the night on the front lines with the infantry. Our solution was to have the planes during combat operate from a field in the rear of the battery positions and if possible with Service Battery. There they are safe in case of night movements and also have access to battalion maintenance equipment.

The following day several missions were flown trying to spot targets. The accepted doctrine on fire missions at this time was to fire only on prearranged targets with the battery laid before take-off. However, if the target can be selected by someone on the

ground it can generally be seen from the ground and there is no use sending the plane up to adjust on it. Thus it was apparent that the greatest use of the planes would be against targets of opportunity. That day the problem arose of making a base point registration beyond effective observation range from the high ground. The selected base point was a railroad crossing about three miles east of Station de Sened which could be identified on a map. Here the air OP came into its own and the registration was effectively handled in a very short time. The SCR-509 in the plane in direct communication with the fire direction center was employed, using ordinary forward observation methods of directing fire. Later that day we did actually adjust from the air on enemy positions, which gave our battalion the honor of being the first ever to use Cubs for adjusting fire on the Germans.

Enemy air action had been very intense since contact had been made with the enemy two days before. The Luftwaffe, as we learned later, actually had a landing strip behind us and across the range of mountains on our right. Stuka dive bombers, escorted by ME 109's, attacked regularly every hour. On one occasion they were intercepted by a flight of our P-40's. Our Cub managed to make its flights between the attacks. I was wondering, as I suppose everyone else was, what would happen when my Cub made the interception. Then about 1400 it happened. Captain Bill Connor, who did a great deal of the observing throughout the Tunisian campaign, was up with my Staff Sergeant, Claude Allen, when I heard machine-gun fire on the other side of the valley. I had the radio on in my plane and immediately upon seeing the enemy bombers and fighters told Allen to get down. About six 109's were almost over him at 5,000 feet when he started his dive from 1,500 feet. He leveled off and made a nice landing in headquarters battery area, and although bombs were landing all around, the occupants and plane were safe. This incident brought forcefully to our attention the value of instructions to post air sentinels for the purpose of warning the plane when enemy aircraft were in

the vicinity. This was accomplished by each battery putting out one sentinel when the plane was in the air. Because of the dispersion of the batteries, one of the three would always be in a good position to report enemy activities.

The next day our force pushed past Station de Sened and took the high ground five miles east of the town. This advance carried us past the combat command protecting our left flank, leaving that flank exposed. We had ground observation again to the limit of

the mission of organizing the high ground through Feriana as a second defensive position on which the force at Gafsa would withdraw if necessary. There was a very limited amount of time in which to organize the position, and reconnaissance was difficult because of rough terrain and great distances. The Cub was used to great advantage for initial position area and route reconnaissance. By determining the best cross-country routes and positions from the air, subsequent ground reconnaissance was not misdirected. However,



AN ARTILLERY OBSERVATION PLANE IN FLIGHT.

vision. There was no need for air observation for conduct of fire, but there was definitely a flank reconnaissance job to be done. The planes were used for this mission. We received orders to disengage and return to Bou Chebka. One damaged plane was disassembled and hauled in a 2½-ton truck to our area and later salvaged. The other plane remained with a recovering force and took off at daylight, since the march orders were received after dark.

The battalion was attached to the ——— Combat Team, ——— U. S. Infantry Division, and marched that night to join it at Feriana. There was evidence of a large-scale German offensive, and this combat team had

it was definitely necessary to check on the ground in order to be sure a route was passable and a position was defiladed. Relief cannot be visualized properly even from an altitude of two hundred feet. Here two planes were badly needed, but there was no replacement for the one cracked up. Every precaution must be taken to preserve the organic planes, so that when missions do occur the airplanes will be present and in operating condition.

A steady, strong wind sprang up and, although our other plane was tied with six ropes and the wheels dug in, it broke loose during the night and was damaged. It was later repaired without much trouble and the plane

was flying in a few days. Here we learned that during bad windstorms the force of the wind can be broken by placing a half-track or 2½-ton truck up wind of the plane and little difficulty will be found in holding the planes.

During the first day of the Battle of Sidi bou Zid, a small field where two planes of another battalion of the division were located was close to a large vehicle concentration. One of the planes was in the air when a force of enemy bombers came in followed by strafing fighters. The Cub pilot made a quick descent but overshot his landing strip, ending up in a group of trees. The plane burned, and both the pilot and observer lost their lives. During the entire Tunisian campaign this was the only fatal accident we had in the division.

During the operation at Maknassy, where a situation of temporary stabilization developed, we flew a number of missions looking for enemy guns and positions in the mountains. Also, several reconnaissance missions were flown. Our base field was to the rear at Service Battery. One plane would fly to a forward field each morning and fly the missions for that day, returning to Service Battery just before dark. Missions were flown daily when the unit was actively engaged. Our targets were never known before taking off. They were always targets of opportunity. We could not observe from above the battery positions so we went forward till we could see. Since observation from altitudes of six hundred feet was impossible in mountainous country, we flew quite high at times. Some missions were flown at five and six thousand feet in order to go over the mountains on which the enemy had dug in. The importance of a mission will determine how far you may go out of bounds. If the enemy has a good adjustment on friendly troops and is giving lots of trouble, the mission becomes urgent and the pilot must do anything necessary to find the target.

When the southern half of the Tunisian front was evacuated by the Germans, the division went into assembly positions near Sidi bou Zid. During the ensuing ten days the planes were kept busy on reconnaissance

flights over the old battlefields. A great deal of valuable information of German methods of organizing ground defenses was derived by staff and battalion officers from these flights. It was similar to a critique at the end of a phase of maneuvers, except that it was probably considered more seriously and more lessons were learned and remembered.

The long march north started, and the planes met the battalion in an assembly area near La Croix, Tunisia. We moved on to relieve the British in a sector northeast of Beja, going in between the ——— U. S. Infantry Division on the left and a ——— Division on the right. The terrain was simply a series of mountains, or "djebels" as the Arabs called them, which offered a great advantage to the defense. The Germans capitalized on the terrain, using many antitank guns as artillery. It was here that the Cub had a field day. We had complete air superiority and missions were flown with nothing much to worry about except small-arms fire. It was very seldom that the Germans ever shot "ack-ack" at us. One time during a tank attack the plane was assigned to one battery, with direct radio communication from the plane to the battery fire direction center. When the tanks started to move, the Germans had to open up and we had more targets than we could bring fire on. We actually brought fire on nine German batteries. The flight lasted over two hours, but due to the fact that we had favorable conditions and lots of targets, we considered it worth while staying up that long. The enemy guns rarely fired when our observation planes were in the air. Therefore, a schedule of flights was made for the three battalions so that air observation was maintained from daylight to dark. This actually served as a counterbattery measure. The few guns that did fire were promptly picked up and neutralized. This is actually not a good use of the planes, as too much time spent in the air may result in excessive loss of planes and personnel.

We learned it is much easier for the air observer to pick up the flash of enemy guns early in the morning and in the fading light of evening than at mid-day. The German am-

munition gave off a bright flash but no smoke. A great deal depends on light conditions being favorable for accurate identification of nearby reference points in order that fire may be adjusted on the gun after it has fired and is no longer visible.

The Germans withdrew to a north-south line anchored at Lake Bizerte on the north and swinging around to the high ground between Medjez el Bab and Tunis on the south. Lieutenant Colonel ———, commanding the ——— Armored Field Artillery Battalion, wanted information of the extent of

which the Germans had left there to deny us the commanding ground. With this information available there was still no definite assurance that small, well-concealed groups were not between us and Mateur. However, there was certainly no large formation to prevent a quick march. The reconnaissance battalion regained contact a few hours later and Combat Command "B" followed close behind.

When our battalion went into position very close to Mateur, we had the planes on the left flank about two miles from the bat-



CUB PLANE WHICH WILL BE USED FOR ARTILLERY OBSERVATION BEING UNLOADED FROM AN LCT DURING LANDING OPERATIONS NEAR NEW GUINEA.

their withdrawal. The division reconnaissance battalion was working rapidly toward Mateur but by noon had not contacted more than a light rear guard action and mines. The Colonel, piloted by Staff Sergeant Schoonover, ventured out ahead of the reconnaissance and drew no fire. They flew on toward Mateur observing the flat valley for signs of ground troops. They passed the rolling ground just south of Mateur without incident and so proceeded past Mateur. They drew small-arms fire from Djebel Achkel about seven miles north of Mateur. This was the first information we had of the garrison

tory positions. We flew many missions in this area and on one flight picked up an enemy battery firing on the British. As this was out of our sector and we could not fire on it we reported the coordinates to them and they neutralized it. It was here that our battalion was being shelled by a long-range enemy battery. In an effort to locate them, we flew several miles behind the enemy lines and over Lake Bizerte where we would be safe from small-arms fire. During the first two trips out they ceased firing and we were unable to locate them. The third attempt to locate them was successful, but our 105's

could not reach them. Our fire direction center contacted the ——— Field Artillery with their 155-mm rifles. We adjusted them through our fire direction center, which had telephone communication with the 155-mm rifles. This adjustment required nearly an hour due to slow communications, but we accomplished the mission and the enemy battery was silenced. Through the entire fighting around Mateur the planes were used very extensively for both adjusting fire and reconnaissance. One time during a tank attack I heard Lieutenant Colonel ——— of the ——— Armored Field Artillery Battalion adjusting his battalion from the air on three different targets *at the same time*.

The planes were not used very much the last two days of the campaign. Our initial attacks were successful in taking the high ground overlooking enemy positions. However, when the German surrender came, there was a great demand for all the planes of the division to get a close-up aerial view of the final position the Germans had occupied. I was in the air shortly after the terms of unconditional surrender were accepted by the Commanding General of the 15th Panzer Division and other miscellaneous units. I shall never forget the sight of some 39,000 German prisoners filing out onto the roads and being collected at crossroads. The olive groves from Bizerte to Tunis were checkerboarded with burning vehicles and supply dumps. Almost everything, except three plainly marked hospitals, was burning. A few Germans were attempting to escape in small boats, but tanks drawn up on the beach were shelling them. It was definitely not a Dunkerque, but a scene of complete submission—no navy, no Luftwaffe. They were sacrificed and they knew it.

The division spent the summer in an area close to Rabat, Morocco. Here we received new equipment before being moved up near Oran. From this area we were loaded on boats and landed in Italy. The division was assembled in the vicinity of Naples and from there preparations were made to move to the front lines. We encountered a very different situation in Italy than we had in Africa. The

Tunisian campaign was an open war picture—lots of front to be covered and large concentrations of troops were infrequent. The planes nearly always stayed with the battalion, using a landing strip which was used only by that battalion's planes. In Italy there was a large concentration of troops on a small front, and landing strips were very scarce because of the mountains and the extensive cultivation of the ground. The divisions were forced to operate all the planes of their battalions from one division field. Missions were flown for all battalions from the division field. In some cases a forward battalion field was used in addition to the division field.

While the primary mission of the artillery planes is to locate targets and adjust artillery fire, many other uses for the planes have developed. The most important of these are reconnaissance of roads, bivouac areas, front lines, enemy installations, and, as previously pointed out, flank protection in open warfare.

In the early stages of the landing at Salerno, the best way one division commander could determine his exact front lines was from Cub planes. Five planes were sent out at daybreak each day to reconnoiter assigned areas thoroughly. At the crossing of the Volturno another division used its planes to spot enemy forward positions and installations, plotting them on a map without bringing fire upon them. Thus when the attack was begun artillery fire immediately neutralized these positions. On occasions the division's reconnaissance battalion and tank destroyer battalion borrowed the artillery planes for reconnaissance missions of their own. Another use of the plane was to afford a rapid means of transportation to commanding officers whose command extended over such a large area that much time would have been lost by the use of ground vehicles.

In summary, it should be said that the air OP is essential to the operation of artillery under all terrain conditions. It should be remembered that when ground observation is possible the air OP should not be used. It is an alternate means of observation only. When not required to adjust fire, it can and should

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be used for flank, route, and position area reconnaissance. When great distances are involved, it may be used for liaison work. When an adequate camera is available a limited amount of oblique photography may be accomplished. Our missions usually lasted about forty-five minutes due to the fact that we had to locate our own targets which required

some time, plus the time to bring fire upon them. It was necessary to go behind the lines at times in order to obtain observation at the place we wanted it. In any event, however, the unarmed, unarmored airplane should be flown for the shortest period of time, at the minimum altitude, and in the safest area possible to accomplish its mission.

Russian Front-Line Newspapers

Digested at the Command and General Staff School from an article by Lieutenant Colonel Maxim Levin in *Information Bulletin*, Washington Embassy of the USSR.

Lieutenant Colonel Levin is Assistant Chief of the Press Department of the People's Commissariat of Defense of the USSR.

AN extensive network of front-line newspapers has been set up in the Red Army. These papers, published in editions totaling millions of copies, may rightly be classed as an important weapon of the Red Army. They serve as a medium for the exchange of battle experiences and keep men and officers in touch with domestic and foreign affairs. They are the first friend and adviser of the serviceman in the field.

Front-line newspapers are issued daily at every front and in each army, and every other day in each army corps and division.

Besides its regular staff of journalists, every army newspaper has a large number of contributors, ranging from generals to buck privates serving as infantrymen, machine gunners, snipers, scouts, sappers, artillerymen, cavalrymen, tankmen, and fliers. Front-line newspapers are put out by the servicemen themselves, one of the main reasons for the extreme popularity of the Red Army sheets.

The contributors are Red Army privates and sergeants actually engaged in the battles. Their opinions on how to act in different circumstances in the field, how to surmount various obstacles, are published in the columns of front-line newspapers. The edu-

cational significance of such material is tremendous. The fighter-reader realizes the articles are written by men skilled in their respective army professions, from whom he can learn many vital points.

The staffs of front-line newspapers encounter numerous hardships and difficulties, frequently publishing in the immediate vicinity of the forward positions and often as not under enemy fire.

Besides the printed publications put out by the fronts, the armies, army corps, and divisions, there is another variety of army newspaper: *Boyevoy Listok*, a hand-written sheet issued regularly on the battlefield by Red Army companies, platoons, and squads. The *Boyevoy Listok* is the Soviet soldier's boon companion. These small sheets contain reflections about the fighting, briefly describe battle episodes and bring the latest radio news issued by the Telegraph Agency of the Soviet Union.

Boyevoy Listok is put out on the march, on the eve of battle, in a lull between operations, and sometimes in the thick of fighting. The papers are issued by the fighting men themselves, and most of the editorial workers are company and platoon commanders, or the more literary-minded among the privates.

One of the strongest weapons of the Red Army men, the front-line newspapers are playing a prominent role in scoring new victories over the enemy.

G-4's Role in a Motor Movement

LIEUTENANT COLONEL HARRY AUSPITZ, JR., *Field Artillery*
Instructor, Command and General Staff School

NAPOLEON said, "An army marches on its stomach." However, without detracting from the great Corsican's remark, a harassed G-3, or G-4, when looking for transportation to move his division might well be tempted to change this to "An army marches on its trucks."

In general, our infantry divisions have been assigned sufficient organic transportation to move, or carry, the heavier weapons, equipment, and ammunition, and maintain normal supply needs. However, insufficient organic transportation has been furnished to move all troops, equipment, and supplies in one trip. The bulk of the infantry still must walk!

This means that if situations arise that require the infantry to be motorized, or additional transportation is needed for administrative purposes, it must be procured either from sources outside the division or taken from within the division itself by diverting vehicles from their "normal" functions. If additional transportation can be obtained from outside sources, we have only relatively small details to consider with regard to our motor movement. If our request is denied and we must move our division by means of organic transportation, then our problems multiply.

The division G-3 and G-4 are the staff officers who are mainly concerned with this type of motor movement. Although G-3 will make recommendations on the tactical considerations involved and the number of vehicles needed, it is up to G-4 to make recommendations as to the use of the division organic transportation in order to translate this tactical concept into a motor movement. However, before G-3 can draw up the motor movement order, or G-4 can formulate his supply plans, they must agree on the answers to the following questions:

1. How many vehicles will each staff officer require to complete his respective portion of the move?

2. Which units will use these vehicles? Knowing where the excess vehicles will be located will enable the staff to make plans to overcome the disruption caused by the transfer.

3. What routes will be followed? G-3 will have certain tactical considerations in mind when he designates the routes, G-4 must know the route selected in order to coordinate traffic control, designate the main supply road, and calculate time and space factors for resupply.

4. What traffic control will be necessary? G-3 may desire to have the movement expedited. G-4 will have to coordinate control with the division Provost Marshal and may desire G-3 to furnish additional help to the Military Police.

5. How soon will the vehicles be released? Both G-3 and G-4 are interested in this because both may have additional use for them after the current movement.

Having reached an understanding on these fundamentals, both officers are now in a position to concentrate on their respective problems.

Inasmuch as the bulk of the transportation will be drawn from "administrative" rather than "tactical" vehicles, G-4 normally will be asked for his recommendations as to which vehicles will be used. The G-4 knows that no matter how brilliantly conceived, the tactical plan will fail if the administrative plan cannot back it up. Both the British and Germans found, in North Africa, that logistics was often as important as tactics!

In order to determine whether or not the administrative plan can support the tactical, G-4 must find the answers to several questions:

1. How long will the supplies last that are being carried forward? This length of time is the period within which he must establish resupply.

2. How soon can the supplies, dumped in

rear areas, be brought forward? Can we bring these supplies forward before those carried in the motor movement are exhausted?

3. How long will it be before the entire system of resupply can be established once more? Can we reorganize and reestablish our entire chain of supply before those supplies within the division areas are exhausted?

4. Can the operation be supplied even though the normal supply arrangements and facilities are disrupted? This question ties

The answers to these questions will determine how successfully the administrative plan can support the contemplated movement.

The G-4, having decided that under normal battle conditions the supply situation will bear up under the strain of the move, now has to make a recommendation as to what units he will draw the vehicles from. So far we have been dealing with theory, but now we must translate theory into reality. Let us assume that we desire to move two combat

EXAMPLE OF WORK SHEET SHOWING AVAILABILITY OF CARGO TRUCKS (1½, 2½ AND 4-TON) IN THE INFANTRY DIVISION FOR MOVEMENT OF FOOT TROOPS.—This table shows a priority which might be established within a division for the availability of organic motor transportation of units scheduled to be moved in the second echelon, to be used for movement of foot troops of the first echelon. The table can also be used in determining the priority of transport to be used in motorizing an infantry unit in reserve, or for cargo hauling.

WORK SHEET—AVAILABILITY OF MOTOR TRANSPORT FOR TROOP MOVEMENT ①③④

Pri- or- ity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Normal Use	3 Inf Regts (each)	3 FA Bns 105- mm How (ea)	FA Bn 155-mm How		Engr Bn		Med Bn	QM Co		Sig Co		Total			Ag- gre- gate	
1½- ton	2½- ton	2½- ton	2½- ton	4- ton	1½- ton	2½- ton	1½- ton	2½- ton	2½- ton	1½- ton	2½- ton	1½- ton	2½- ton	4- ton			
1	Cargo Trks.....										48				48		48
2	Pers & Orgn equipment.....	1	2	1	1			1		6			2	3	19		22
3	Am & Pion tools.....	3												9			9
4	Kl Trks.....		19	5	5			4	2	3	1		2		87		89
5	Engr tools.....							36							36		36
6	Assault boats.....							1							1		1
7	W Sup.....							3							3		3
8	Am.....	2	9	15	12	3		3						6	87	3	96
9	Comd & Opns.....			1	1						1	1		1	5		6
10	Med Sup.....									3							3
11	Sig Com.....		1	1	1							3	12	3	19		22
12	Atchd Med.....		1					1						1	3		4
	TOTAL.....	6	32	23	20	3	1	48	2	12	50	4	16	25	311	3	339

① The availability of cargo trucks and priority of such availability are command decisions.

② Prime movers omitted. See paragraph 344, FM 100-5.

③ Unit maintenance vehicles omitted as they usually accompany motor vehicles of the unit.

in with 3 above. G-4 knows that in addition to depriving units of essential supply vehicles, many things can happen that were not contemplated. Vehicles may not return in accordance with the schedule set up, vehicle losses may be excessive, dumps that the G-4 plans on using may be destroyed, and a multitude of other unforeseen factors may creep in.

teams forward. The staff estimates that 138 2½-ton trucks will be required. What method will G-4 use to determine where these trucks will come from? He could say to himself, "Let's see. Two combat teams are moving forward, so that eliminates their vehicles. We need 138 additional trucks. I'll draw them from the units remaining behind, requiring each such unit to furnish its proportionate

share." Following this line of thought, the remaining infantry regiment would be required to furnish sixty-six 2½-ton trucks, a physical impossibility since it has only sixty-four 1½-ton and 2½-ton trucks. Furthermore, this regiment would lose much of its combat efficiency for lack of essential vehicles.

A better system would be to analyze the purpose for which vehicles are used within each organization and draw away only those that will least impair its efficiency.

Those vehicles used for "tactical" purposes will probably not be considered available for other uses. Whether those remaining can be used will depend upon various factors. In order to examine easily the vehicles that may be used for motor movements the table on page 41 has been devised.

An examination of this table shows, in column 1, the use to which the parent unit has put these trucks, and subsequent columns indicate the organizations to which they belong. The question as to where we must draw additional transportation from is one of practicality rather than theory. For example, the quartermaster company has forty-eight cargo trucks. Whether any, or all, will be used for our movement depends upon both the tactical and administrative situation. The division commander may desire ammunition or mines

carried forward, or the G-4 may recommend gasoline be carried in order to replenish the fuel at the end of the first movement. Kitchen trucks are also a good source of additional transportation, but here again we must consider the pros and cons. At least one kitchen truck per battalion should be retained in order to draw rations.

Ordinarily, we can obtain sufficient transportation from within the division to make our motor movement, but if G-4 is to utilize the division transportation in the most efficient manner, it is evident that he cannot be arbitrary in his recommendations, but must give due consideration to the effect that a withdrawal of transportation will have upon both the unit and his administrative plan.

To summarize, G-4 must always keep in mind that while a motor movement can be, and often is, advantageous, it will almost always disrupt supplies. If such a movement is contemplated, G-4 must anticipate this supply interference and make comprehensive plans to overcome this handicap. Although G-3 will conceive the movement and draw up the orders, both staff officers must work closely together in order to assure that the movement will be successful administratively as well as tactically.

Employment of DUKW's

AN official report on DUKW operations at Salerno included these recommendations:

"Staff officers should be acquainted with the correct tactical employment of DUKW's and with their limitations, which make their diversion to other tasks inadvisable. DUKW's are unsuited for ordinary road transport due to their large turning radius, the tendency of the hull to spring leaks during hauling over rough roads, and the fact that on narrow roads their width interferes with the flow of two-way traffic.

"Where staff officers are unfamiliar with the organization of DUKW units they some-

times direct illogical groupings which make control difficult. In the preliminary planning an officer from the DUKW unit should be given an opportunity to offer suggestions in cases where companies and platoons are to be split up. Such suggestions might well result in tighter control over DUKW operations and in more efficient operation.

"Sufficient advance information on the type of beach, location of dump and dispersal areas, and bivouac areas should be given company and platoon officers so that they can give instructions to their drivers before landing."

No Regimental Reserve Line

COLONEL R. C. ALOE, *Infantry*
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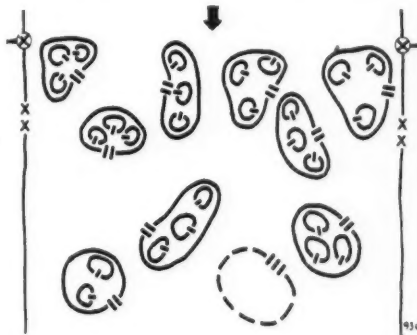
MOST of the reports coming back from the combat zones stress the need for depth in any defensive position. Depth is nothing new; our Field Service Regulations have always stressed it, although only too often, in reading that good book, we have missed this important point. Another important point we often miss in studying these regulations is that "a battle position comprises a zone of resistance consisting of a number of *mutually supporting* defense areas disposed irregularly in width and depth, each organized for *all-around* defense . . ." (Italics ours.) When we consider the ability of our enemies in the use of infiltration tactics and when we consider the speed available to this enemy, we can see the need of *all-around* and *mutually supporting* defense areas. In considering the location of these mutually supporting defense areas we should plan to place them on vital tactical localities which dominate the adjoining ground. These tactical localities when emplaced should then be prepared for an attack from any direction.

Army Ground Forces has foreseen this necessity and has eliminated all reference to the regimental reserve line from the discussion of the defensive position in FM 100-5. What is the reason for this? The apparent reason is to permit the regimental commander to place his reserve battalion (or battalions) on a key terrain feature that *can be held* and to permit this reserve battalion to dig in and get all set in a position that will be mutually supporting with the front-line battalions. Like the forward positions, the reserve position should be strong and completely prepared for all-around defense. Thus the reserve battalion should be organized in depth to defend its position in strength rather than thinly extended across the regimental area in a weak attempt to cover the entire sector.

In the past when the regimental reserve line was used there was a tendency on the part of unit commanders to feel that they should attempt to cover the entire rear area of the regiment. This automatically forced

the reserve to take a position in line. As a result, if the enemy made a penetration in strength he would find a line defense behind the forward main position. This line could hold to some extent but not so well as if that reserve battalion were placed on a tactically strong position in depth able to hold out and fight off the enemy penetration with as much strength as one of the forward battalions.

Another way this regimental reserve has been handled has been to prepare several positions. The idea was that one of these positions would be occupied after the main enemy thrust had been developed. Reports from the Italian front show this to be impractical because the enemy immediately places heavy mortar and artillery fire on any movement of reserves. Therefore, it again appears that the most practical use of the regimental reserve is to select the dominant terrain feature in the reserve area, and occupy and improve it so it can be held against an enemy penetration from any direction.



The sketch shows schematically a way a division might possibly be employed on the defense. Here we have shown four forward battalions each on selected terrain features and each in position in depth—prepared for all-around defense as well as the normal defense to the front. Behind that we have two battalions on key terrain features; these battalions also are dug in and prepared for all-

around defense in depth. Behind these are the other three battalions of the division dug in for all-around defense on selected key terrain features. Battalion positions are within mutually supporting distance.

Key terrain features do not always need to be garrisoned by a full battalion. There will be cases where two companies will be sufficient. In the sketch, the lower left battalion is shown with only two companies; the third company could be used anywhere else in the area as needed to strengthen one of the other battalions that might not have such a tactically strong position. In the same way battalions should be fitted to the ground where needed.

Referring again to the sketch, a regimental area has been shown by dotted lines to represent the fact that the rear three battalions, or any part of this rear regiment, may be assembled under cover at a designated place as a counterattacking force. This assembling of the rear battalions should be done only after their defensive positions have been thoroughly prepared and the battle has developed to the point where the commanding general can feel that these reserve battalions will not have to fight in place due to enemy action. In all probability these rear battalions will be held in their defensive positions until ordered to the assembly area by the division commander for an ensuing counterattack.

This type of defense has two great ad-

vantages. First, if every man in the position knows his battalion area is prepared for all-around defense, his normal tendency to panic when he hears firing in rear areas is greatly lessened. Second, when the enemy strikes the position from any direction he meets successive strong resistance from successive self-sufficient units organized in depth. Assume he is able to overrun one or more front positions, or to work between these positions—which should be a terrific job in itself if the gaps are filled with mines and fire from the position is still holding—he will then bump into another position just as strong as the one he has passed—and behind that others just as strong. If he is able to work deep into the position he should be so shot up and disorganized that he will be vulnerable to the defenders' counterattack.

One question that will come up is, "Does this preclude local counterattacks?" The answer is *No*. If the attack thrown by the enemy is such that it can be ejected by local counterattack, of course this should be done. But remember that when we are on the defense, the enemy selects the point of main effort. He probably will not attack unless he has forces he considers strong enough to break into and through the defense; therefore the *entire* defense must be prepared to withstand this main effort. In this case counterattacks will probably come from division or corps reserves as all the rest of the defenders will be fighting to hold their positions.

All staff officers should cultivate the art of reading a map in a car traveling at forty miles per hour, which, as you know, is not an easy matter. Commanders usually expect their staff to find the way for them and few things are so likely to cause irritation or to shake the commander's faith in the infallibility of his staff as a few mistakes over map reading. Commanders do dislike being landed in a cul-de-sac where it is impossible to turn the car.

—From an article in *The Tank* (Great Britain)

Aircraft Carrier Information for the Army

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IT is believed that many officers and men of the Army have only a superficial knowledge of aircraft carriers and that additional information along that line might be of interest. Therefore, let us take up some of the primary considerations involved from the point of view of a planning staff and the operations themselves. In these days of joint operations it is particularly important that the Army be conversant with the limitations and capabilities of aircraft carriers. The early history of aircraft carriers will not be discussed at this time as I believe it would be irrelevant. We will also assume everyone knows that planes take off from and land aboard carriers.

In order to arrive at the proper solution for the command organization and employment of carrier forces, we must have a thorough grounding in the actual aircraft operations involved. The use of air power from carriers involves two technical factors which must be kept in mind. The first has to do with the performance of the aircraft in the air, and the second—which is equally important—is the operation of the carrier as a ship, or mobile airdrome as the Army might wish to consider it. It is impossible to divorce these considerations because their combined influence has a direct bearing on the employment of carrier-based aircraft.

In taking up the first factor, the Navy normally has three principal types of planes, all single engine, namely, fighter, bomber, and torpedo, which are carrier based. The fighters can be considered as all-purpose—they are capable of outclassing practically any type of enemy plane, be it shore or carrier based, at any altitude. This is a broad statement, when it is considered that carrier fighters have inherent handicaps, such as the additional weight involved in the wing-folding and the arresting hook mechanisms. Nevertheless, they possess speed, ruggedness, maneuverability, climb, and fire power which make them compare favorably with any en-

emy fighter in use today. The carrier-based bombers perform varied duties such as scouting and antisubmarine patrols in addition to their principal job of dive bombing. Glide bombing and strafing are also effectively done with this plane. The torpedo planes carry bombs and bombsights and they can be used for either glide or horizontal bombing, in addition to their primary mission of dropping torpedoes. The armament of this plane must be stipulated before a mission because it cannot carry both bombs and torpedoes. This plane can be used for long-distance scouting by installing a large gas tank in the bomb-torpedo bay. This is a secondary employment because it prohibits the plane from being available for offensive missions. Both the bombers and the torpedo planes also carry defensive guns, but it is not desirable to send them on missions without fighter escort. It might be appropriate to state here that it is far better to have as much air-scouting as possible done preferably by land-based multi-engine planes. This enables carrier-based planes to be saved for offensive missions. To illustrate this point, there is the occasion which arose during the operations in the Solomons in August 1942, when one of our carriers was required to use approximately half of her bombers for scouting purposes, whereas they were needed for impending attacks. Several B-17's or B-24's, if available, should be used in times like that, but it requires excellent liaison and training if Army personnel operates scouting planes for the benefit of carrier forces.

It is difficult to state the limitations or capabilities of carrier-based planes in regard to range of action and bomb loads. The small deck space for landings and take-offs is a definite consideration. It is possible, however, for planes to take off with auxiliary gasoline tanks plus an extra weight of bombs. The use of catapults enables our biggest carrier-based planes to take off with capacity loads under minimum wind conditions. The limited

deck space available for landings naturally requires that planes have a comparatively low landing speed. Because of this peculiarity of carrier-based planes, it is possible to use them in airdromes too small for Army planes, such as occurred in Dutch Harbor in July 1942 when a squadron of Navy fighters became shore based and used a strip 2,500 feet long which was somewhat too short for Army fighters. Careful staff planning by the staff aviators involved is required to have a complete mutual understanding regarding the performance expected of carrier-based planes.

A definite effort has been made to equip individual carriers with aircraft of equal speed, endurance, and range. The need for this is quite obvious because at sea an Air Group—all planes from one carrier—is usually launched, operates, and lands aboard as a unit. This provides a balanced team which has many advantages such as sending out pilots who have been identically briefed and who have been trained together. It is possible to equip individual carriers with one type of plane such as was done during the North African invasion when one of the carriers present had nothing but fighters aboard. The escort carriers used for fighter defense off Salerno carried nothing but fighters. This scheme is dependent upon the situation and it must be treated with caution because if a single carrier in a task force having only fighters becomes a casualty, the force will be temporarily without fighter protection and you will have a badly balanced fighting team. In other words, the force would have offensive capabilities without proper air protection, or it would be defensive with no fighters for hitting power. Certain benefits are to be derived from operating only one type of plane from a carrier. This method greatly simplifies the spotting on deck because it isn't necessary to keep the different types of planes segregated. The upkeep problem is also minimized when servicing only one type of plane. Because of a shorter take-off space required for fighters, you could possibly operate more from a carrier which could normally handle fewer planes of a composite group. The normal setup is for the Essex-class carrier to

carry about eighty aircraft. The Independence or converted cruiser-type carrier normally carries about thirty-six planes, and the smaller escort carriers will operate about twenty-one, depending upon their design. Nowadays all carriers are being fitted out with folding wing type planes and this will possibly slightly increase these figures.

While it is usually intended to operate a group of planes from its parent carrier, frequently squadrons are shifted either from the stress of battle or for tactical reasons. Our many carriers are expected to be organized, trained, and standardized along almost identical lines. However, there are small differences or characteristics which will temporarily handicap operations if types of planes are transferred, without due consideration, from carrier to carrier. It should be stated, however, that a carrier pilot can land on any carrier and get the same attention as is probably accorded an Army pilot who lands on an airdrome other than his own.

The second technical factor to be considered involves the operation of the carrier as a ship or floating airdrome. Perhaps this phase should be opened by briefly mentioning the command organization for carriers. In the first place a carrier would never operate independently. In fact, any big ship is normally escorted by screening ships. This results in a grouping of ships, giving us the familiar task force. The long-range *offensive* element of this task force is the aircraft embarked in the carrier or carriers. If this element is successful, perhaps the surface forces will not become engaged. The battle of Midway was an example of this. The ships accompanying the carriers provide the "air-drome defense," as the Army might express it. Great care is exercised in the organization of carrier task forces, depending upon the mission involved. For instance, in sweeps against small islands where it is not likely that heavy enemy surface units will be found, the carrier task force will only be screened by destroyers and possibly one or two heavy cruisers. On raids such as the recent ones against the Palau Islands, the individual carrier task forces were probably escorted

by fast battleships, in addition to the usual cruisers and destroyers, because it was likely that enemy capital ships might be encountered. The commander of an offensive carrier task force would probably use a carrier as his flag ship. This commander, who is undoubtedly an aviator, commands all the ships of the force. If the role of the carriers was to be a supporting one, such as during amphibious operations, the officer, probably a non-aviator, in charge of accomplishing the *major task* would be known as the Commander of the Naval Attack Force and the carriers would be one of the units under him. He would probably designate the senior air officer in his carriers to command the carrier task forces involved. This officer would in turn organize his forces as a covering force which would be found broken down into escort and striking groups with the senior aviator embarked in each group as the commander of that group. Commanders of a carrier cover group would probably be immediately responsible to the commander of the amphibious forces. The strategic and broad tactical control of the Naval Attack Force is vested in a naval commander having large offices ashore in a rear area. His office is suitably equipped to analyze reports received from many sources, the use of his radio is not limited and he is in a proper position to coordinate shore and sea movements. So much for the command organization.

The next consideration in the operation of carriers is their employment. They are perhaps best used offensively. They possess mobility, which is probably the chief reason for their existence. They are reasonably self-sufficient and self-supporting. However, they are vulnerable and they should not be allowed to stay long in one area because they are prime targets for attacking forces. They should make their attack and retire. It is not proper to operate them in confined or narrow waters because they should have unlimited sea room for defensive purposes and for using the all-important element of nature—wind. It is mandatory for landing and launching planes—unless the slower method of catapulting is used for launching—that you

have approximately twenty-five to thirty knots of wind over the deck. Carriers should not be expected to have sufficient speed to produce this wind over the deck unless they head directly into it.

In further considering the carrier as a ship, there are certain inherent characteristics which are at great variance with the employment of aircraft from a ground base. There is the ever-present problem of arranging planes on deck according to types, take-off order, take-off run, etc. When planes land aboard and are stopped by the arresting gear, they are immediately taxied or pushed forward. This is done expeditiously because it is necessary to clear the landing area for the following planes. There is only sufficient room for one plane to land at a time. Eventually, all planes are landed and are in a tight "spot" forward. Probably the fighters, bombers, and torpedo planes are all mixed up. This situation is unscrambled with considerable effort when all the planes are either pushed or towed aft and re-spotted for a take-off. A point not readily known to the layman in this particular is that the planes are of an awkward size and weight to push by hand, the deck is constantly pitching or rolling, and there is frequently a strong wind over the deck. Small, especially-built gasoline cars are frequently used to tow planes but they are not entirely satisfactory for such close spotting as placing the planes a matter of inches apart. Occasionally a plane landing aboard will have a landing accident and become immobile when in the arresting gear on the flight deck. This will require stopping succeeding landings until the damaged plane has been removed and the arresting gear repaired if it became damaged. Such an unexpected accident aboard a carrier will slow down operations, whereas if a plane becomes a similar casualty on an airdrome of average size, operations would not be seriously handicapped. The take-off area on a carrier is only large enough to permit single plane take-offs, whereas several planes can probably take off simultaneously from an airdrome. All carriers are equipped to operate their planes at night and this is frequently done. However,

this requires a high degree of training both on the part of the ship's personnel and the pilots.

In considering the operation and use of aircraft carriers and their aircraft, it should be remembered that they are only one unit

or an integral part of a huge team consisting of battleships, smaller ships, submarines, etc. The most effective use of naval power is attained by combining all these forces into a task force under the command of one commander. This presents naval power at its best.

Management of the American Soldier

An extract from *Management of the American Soldier* by Major General David C. Shanks, U.S.A., (first published, 1918; reprinted, 1942).

THE best grip any officer can have on the American soldier is on his pride. Therefore, do everything possible to build up the soldier's pride in himself and in his record. Constantly appeal to him to keep a clean and honorable record.

Treat the American soldier as a man; look him squarely in the eye when you talk to him, and treat him justly.

Never do anything to lessen the respect of the soldier for himself. Never put a young soldier in the guardhouse if it is possible to avoid it. Many a young soldier gets started wrong by being kept in the guardhouse with bad men who are confined there because they can be managed in no other way.

As far as possible use company punishment. Men respect an officer more who is able to handle his men without having to use outside means for discipline. To be able to run your company yourself is a great asset; be careful not to lose it.

Give short talks to men on subjects which they ought to know. Be sure the talks are short. Have something to say; say it; then stop.

Teach the soldier to have proper respect for his uniform. Teach him that if he becomes reeling drunk in his uniform or wears it to low dives he brings discredit upon himself and upon the uniform of his country.

Look carefully after the company mess. Much of the discontent in a company is founded upon dissatisfaction with the food and the way it is served.

Teach the soldiers to be neat in person and clean and sober in their lives. Force of example is the greatest of all aids in this respect.

Prohibit the use of dirty, vulgar language. Punish offenders and see that your instructions are carried out.

Be extremely careful about your manner in dealing with soldiers; they are entitled to a respectful and patient hearing. Some officers seem to go on the theory that military efficiency consists of a loud voice and an important manner.

Don't attempt to gain cheap popularity by unofficerlike acts. Soldiers are not slow to size up an officer. They soon learn whether his interest in his men is feigned or real. They respect and admire the officer who requires a strict performance of duty. The true rule for handling soldiers is: Don't nag them; don't neglect them; don't coddle them.

Be an optimist; cultivate that habit. There are some men who always see their troubles with great clearness. They are always afraid that things will not turn out just right. The man who is an optimist is like a breath of fresh air. He cheers all who come around him. One of the great sayings of Lord Nelson was; "I am not come forth to find difficulties but to remove them."

Remember Napoleon's maxim that in war the moral is to the physical as three to one. Strive to arouse a proper spirit in the men individually and in the organization as a collective unit. Not much success can be hoped for unless the proper spirit is aroused.

Civil Affairs Control Organization

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WHAT was one of the important reasons why France fell so quickly to the Nazi juggernaut? Why could not the valiant defenders of Bataan resist the first Japanese swarm on Luzon longer than they did? One answer to both of these questions was the inadequate and incorrect method of controlling civilians.

The purpose of this article is to emphasize the means normally available to a commander for the purpose of civilian control, particularly in the combat zone. It is hoped that the knowledge gained will increase the preparation of adequate plans in advance regarding the proper employment of civilian control agencies.

First, let us obtain a background for this subject. A few initial definitions will help. The first of these, civil affairs, may be defined as "all the activities of the government and of the inhabitants of an occupied territory, except those activities of an organized military character." The second definition, civil affairs control, is the "supervision of these same activities of civilians by an armed force, by military government, or otherwise." The final term we should understand is military government. It is "the supreme authority exercised by an armed force over the lands, property, and the inhabitants of enemy territory, or of allied or domestic territory recovered from enemy occupation." From these definitions, in any occupied territory in which military government is established, civil affairs control will also exist. However, the converse is not necessarily true; that is, wherever civil affairs control is established, military government is not necessarily established. Let us apply this reasoning to specific countries in this war. Italy has been, and Germany and Japan will be, subjected to both military government and civil affairs control. France, Belgium, and Norway will temporarily have civil affairs control, but probably will not have military government; at least, not under the name of military government. The distinction between

the two terms is fine and in some instances may not be important. Regardless of whether we operate with Allied Military Government (AMG) or Allied Control Commission (ACC) in Italy or in France, the problem of military control of civilians is the same.

When any individual is confronted by a particular problem, two questions naturally arise. The first question is: "How can this problem be solved correctly?" and the second is: "What authority do I have for my solution?" Each of the questions has its counterpart when a commander considers the problem of civil affairs control. For example, the commander must ask himself: "What can I do to prevent civilian actions from hindering the coming operation?" And also: "What right as a military commander do I have to make civilians conform to my wishes?"

A broad general answer to the question of what can be done to prevent civilian interference can be expressed briefly as timely planning and written instructions to the commanders concerned. On the division level, early formulation of a civilian control plan may well be included in the division Standing Operating Procedure. Then, as subsequent situations occur, the SOP may be modified as necessary. Thus instructions regarding handling of civilians in a particular situation may be announced as additions or modifications to the SOP. This can be accomplished by fragmentary messages to subordinate units, by inclusion in paragraph 2 of administrative orders, or by issuing a civil affairs annex to administrative orders.

As an example, the division SOP might include the following statement regarding arrests of civilians: "Where civilians are arrested on suspicion of dealing with the enemy they will be interned and evacuated to Prisoner of War collecting points; and will not be permitted to mingle with prisoners of war. They are entitled to the same treatment as prisoners of war."

The answer to the second question confronting the commander is: the authority

for the control of civilians is contained in the Hague Convention, international law, and governmental interpretation of these, such as FM 27-10, "Rules of Land Warfare"—a text which contains both the written and unwritten rules of war. The written rules are those contained in various treaties or conventions to which the United States is a signatory; the unwritten rules have never been subscribed to formally, at least so far as an agreement with another nation is concerned, but they have been recognized by nations and by authorities on international law.

Military government or civil affairs control, like other military operations, requires flexibility. In no two situations will the problem of civilian control be identical. Language, history, economic and political background, and terrain will contribute in making every situation different.

Whatever the situation, our commanders in this war have two guiding principles to follow. The first of them is the principle of military necessity; the second is itself a group of principles, namely Allied policy. The principle of military necessity is stated thus in the Rules of Land Warfare: "Subject to the principles of humanity and chivalry, a belligerent is justified in applying any amount and any kind of force to compel the complete submission of the enemy, with the least possible expenditure of time, life, and money." The principle of humanity is included in Allied policy. The principle of chivalry was subordinated when Germany invaded Czechoslovakia and Poland, and when Japan struck at Pearl Harbor while still ostensibly in friendly conference with our government at Washington. In addition to the principle of humanity, Allied policy includes the fact that commanders are responsible for the relief of the civil population and also for the provision of a substitute for the displaced civil government. Relief includes such items as food, clothing, shelter, and medical aid. Just and reasonable treatment is also required, but control should not be reduced to the excessive leniency that permits the population to become a hindrance to the operation. Reports from observers sent into one theater indi-

cate that our treatment of civilians has been too kindly. For example, consider the group of natives who stood around expecting our soldiers to bury their kindred dead. The principle of military necessity and Allied policy authorize our commanders to be more severe.

One of the cardinal principles of war is unity of command. Under this principle it is easy to understand that military control of civilians is a command responsibility. This command responsibility exists all the way from the commander in chief to the tactical commander in the field. In any particular theater, the theater commander is absolutely responsible for both detailed planning and actual operation of civil affairs control, or military government as the case may be, under the general directives and plans received from higher authority.

Civil affairs personnel are given to commanders specifically to assist them in the solution of this civilian control problem. Let us consider briefly the two general types of civil affairs organization that may be present in any theater. These two types of organization are referred to as "operational" and "territorial." The selection of which type or what combination of both types will be followed depends on a number of factors, among which are the mission of the theater commander, the organization of military forces in the area, the military situation, the structure of the existing civilian government, the geography of the area, the characteristics of the people, and the powers and characteristics of their officials.

Briefly, here is the distinction between the two types of civil affairs organization. In the operational type, commanders of combat units or of military administrative areas are responsible for civil affairs control within their respective areas or zones of operation. The relationship of civil affairs officers of one echelon to civil affairs officers of a higher or lower echelon is the same as that prescribed for other staff officers. The chain of civil affairs control conforms to the operational or administrative chain of command.

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tion is created under the direct command of the theater commander, or under a subordinate commander. Under this setup, local civil affairs officers are not responsible to operational unit commanders stationed in the area with regard to the routine administration of civil affairs matters, but report directly to higher civil affairs officers. It is a function of command to determine the type of organization to be utilized at any particular time and place. The system actually adopted may often involve features of each type.

The chief advantage of the operational type organization—that is, through operational unit and military administrative area commanders—is the fact that it embodies unity of command through all echelons. Its chief disadvantage is the fact that the commanders, being involved, as they surely will be, in matters concerning combat training and operations, supply and evacuation, are apt to overlook the importance of civil affairs activities and their relationship to operations.

The advantages and disadvantages of the territorial type organization which embodies the separate civil affairs chain of command are generally just the opposite of the operational setup. Unity of command is not established in lower command echelons regarding civil affairs control but it is much more likely that civil affairs will not be overlooked or slighted. It also would have these advantages: (1) more effective and more economical use of manpower; and (2) greater continuity of policy and personnel.

Civil affairs in a theater headquarters may become a large activity and require a correspondingly great number of officers to plan and administer. It is worthy of note that a so-called "G-5" staff section to handle civil affairs has actually been established in two theaters. In these theaters civil affairs activities are considered so important as to require the creation of a separate general staff section on a theater level and down to include corps. On the division level, army commanders prescribe the status of the civil affairs staff. In theaters where these general

staff civil affairs sections are not constituted, G/A-1 is usually the coordinator of civil affairs control.

Here is a brief description of how civil affairs special staff personnel might function on a division level. The "operational" personnel would make the necessary plan for civilian control in a particular operation based on instructions received from the G-1 Section and conforming to policies of higher headquarters. Once the operation began, the civil affairs section would exercise the same type supervision of execution as any other special staff section exercises over its functions or responsibilities. The divisional civil affairs staff section normally remains with the division, with the result that as the division moves forward or even as the situation stabilizes, certain portions of civil affairs control are turned over to the "territorial" civil affairs detachments from higher headquarters. The "territorial" personnel would not generally move with the division. This may require the division to request and receive additional new territorial detachments from time to time.

One more item of information might be helpful in compiling background for the subject of civil affairs control. That item is a rule of thumb that may be used in estimating the number of military government personnel required for controlling the population of larger cities or densely populated areas. Roughly, the ratio is one civil affairs officer per 30,000 population. From this ratio it is evident that a large city may require as many as seventy or eighty officers.

Using the information so far portrayed as a background, let us become more specific by considering the problem of civil affairs control in the area of a combat infantry division. Let us assume that this division is advancing toward a town in enemy territory.

The civil affairs organization in this division consists of one civil affairs officer and five enlisted assistants. The civil affairs officer's plan would include the items discussed below and would be coordinated with G-1.

Prohibiting civilian movement, or "freezing" as it is sometimes called, is the civilian

control plan normally resorted to by the leading combat elements entering an area. Natives are required to stay indoors until further instructions are issued. Control is limited to the actual needs imposed by the tactical situation.

G-1, using the civil affairs officer as a special staff officer, develops the plans for civilian control and the provost marshal with the military police platoon executes them. The plan should be simple and flexible. It may include the posting of proclamations and ordinances already prepared concerning civilian behavior. Normally such proclamations are prepared by the civil affairs section in theater headquarters and copies are furnished all subordinate units. Full use should be made of military specialists that may be available in higher echelons, for example, the corps or army military police and civil affairs sections. When necessary, additional personnel from combat units may be detailed to reinforce the military police.

There are many agencies of the civil government that can be helpful. The surgeon, for example, should contact the health authorities to obtain cooperation on sanitation, hygiene, and the well being of the command. Similarly, the division engineer might con-

tact the equivalent of a highway commissioner. Other departments having civilian functions similar to the corresponding military section should be contacted.

After a time initial freezing may be modified and develop into some lesser restrictions depending on the tactical situation and the probable duration of the occupation. Restrictions vary from limiting the traffic circulation of essential workers to the authorized movement of all persons during specified hours. Circulation may be controlled by the use of passes, identification cards, posted areas, and curfews. Plans may also include regulations on trade, liquor, and blackouts.

The operation of civil affairs control is briefly outlined in this article. The practical applications in various combat areas differ widely based on the tactical, strategical, economic, geographic, and political situations. The subject is relatively modern and is changing rapidly. The trend is towards the employment of groups of trained specialists as additional staff officers or as territorial administrators to relieve the tactical commanders of the technical difficulties of dealing with civilian officials. As soon as the military situation permits, this relief is generally effected.

Improved Equipment Facilitates Ordnance Maintenance

A REPORT from an ordnance company in Italy states that equipment improvised in the field is proving valuable in expediting repair and maintenance work in the Italian campaign:

"We have built a small hoist on the front of a $\frac{3}{4}$ -ton truck to convert it into an artillery section vehicle. This vehicle carries the artillery section, which contacts each artillery battalion in the division each day. With this vehicle we can change tubes and do other repairs right at the gun site and avoid having to bring the gun or howitzer to the ordnance company shop. This is a great time saver.

"We have improvised a slightly larger hoist on the front of another $\frac{3}{4}$ -ton truck for use in our motor shop. We use it for lifting engines and differentials in and out of trucks, or for other similar jobs when considerable clearance is required.

"We have also built folding drop benches on the sides of our ordnance shop trucks and on the sides of a $\frac{3}{4}$ -ton trailer, since a mechanic in the field cannot perform efficiently without a convenient place to work. All these improvisations materially expedite our performance of maintenance functions."

The Third Front

MAJOR F. O. MIKSCHÉ

Major Miksche, author of Attack, Is Bombing Decisive? and Paratroops, is an officer in the Czechoslovak Army.—THE EDITOR.

THE present war has revealed elements unknown in any previous struggle in human history. The excessive use of the catchword "total war" has made us forget that in the countries directly affected there remains in fact scarcely any sphere of daily life which is not dominated by war. "Total war," as it is mostly used, refers only to bombing. Actually, modern armies are machines of which we see no more than the indicator dials. Behind these, works an extremely complicated mechanism in which the cogwheels of personal, economic, and industrial life and of morale are all delicately adjusted to one another. The slightest disturbance in the mechanism is inevitably registered by hitches in the working of the fighting armies on the field of battle.

The constantly increasing dependence of the exterior organization on the interior organization entails the consequence that total war can be lost on the home front no less than in the fighting line. Of course, in earlier times disturbances were created in the rear of fighting armies in order to dislocate the enemy's rearward organization. For example, there was the action of the guerrillas in Napoleon's time in Spain and in Russia, the *franc tireurs* in France in 1870, and in the first World War the Franco-Belgian resistance movement and the free partisan bands in the Balkans.

None of these movements, however, attained anything resembling the importance of similar movements today, mainly for three reasons:

1. In former times, fighting armies were not nearly so dependent on their hinterland and its economic and industrial bases as modern highly mechanized forces, in which the absence of a small spare part can make an important weapon useless. To take an example: previously, when two of the six

horses harnessed to a gun were knocked out, the cannon could still be hauled by the remaining four. Today, the failure of a carburetor or the breaking of a caterpillar track renders a tank immobile. Moreover, hungry horses could, if only with difficulty, be made to work, but armored fighting vehicles without fuel or oil cannot move and are helpless.

2. Resistance movements cannot develop into mass action if they lack a political or ideological foundation. Today, all the peoples have recognized that the conflict is one of two diametrically opposed doctrines, and that in this struggle not only national existence but that of the individual and his personal freedom and activity are at stake. This fact causes the German intruders to be hated in every European country and creates an unlimited solidarity. In all the occupied countries today the resistance fronts are mass movements.

3. Formerly the technical means was lacking to render the material and moral aid necessary if the will to resist was to be translated into widespread activity. Nowadays the radio is not only an instrument of propaganda but also a means of communication, transmitting orders and gathering information. Airplanes can carry material aid in the form of weapons, explosives, and instruments, not to mention landing agents, instructors, and leaders. In these ways resistance movements which were formerly only local in their action can be welded into a coordinated whole, not merely within one country but across the frontiers, so that the strategy on the external front can be harmonized with the strategy on the internal front.

What is the situation in which the Germans now find themselves? The conquest and occupation of Europe were strategic necessities for them. The Continent was not only an indispensable base for further operations aiming at world domination, but it was also vitally necessary in order to provide the food, raw materials, and industries which consti-

tuted the second requirement for waging a world war. From 1940 to 1942, the Germans launched successive campaigns in the form of great pincer operations designed to encircle their opponents in Norway, France, the Balkans, and Russia. In doing so they neglected one principle of their teacher, Clausewitz, namely, that the farther an army advances from its base the longer its lines of communication, and the greater the number of small detachments left behind to guard communications. Thus arises the danger that the original encircler may become the encircled. This is the situation of the Germans on the Continent today.

Bearing in mind that women and children are included in the population figures, it is possible to get an approximate idea of the conqueror's position from the following table:

Country	German Occupying Troops, Including Auxiliaries, Gestapo, Police, etc.	Total Population in Millions	No. of Inhabitants to Every German
France ----	500,000	42.0	80
Belgium ----	100,000	8.5	85
Holland ----	100,000	8.0	80
Denmark ---	40,000	3.6	90
Norway ----	150,000	2.8	18
Balkans ---	200,000	21.5	102

What is more, in the Reich itself there are living foreign workers conservatively estimated at eight millions in number. Like a Trojan horse, these enemies of Hitler's European Order have been brought as slaves by the Nazis themselves into the very citadel of the Fortress of Europe. In this manner, in the fifth year of war the Germans are surrounded both from without and from within.

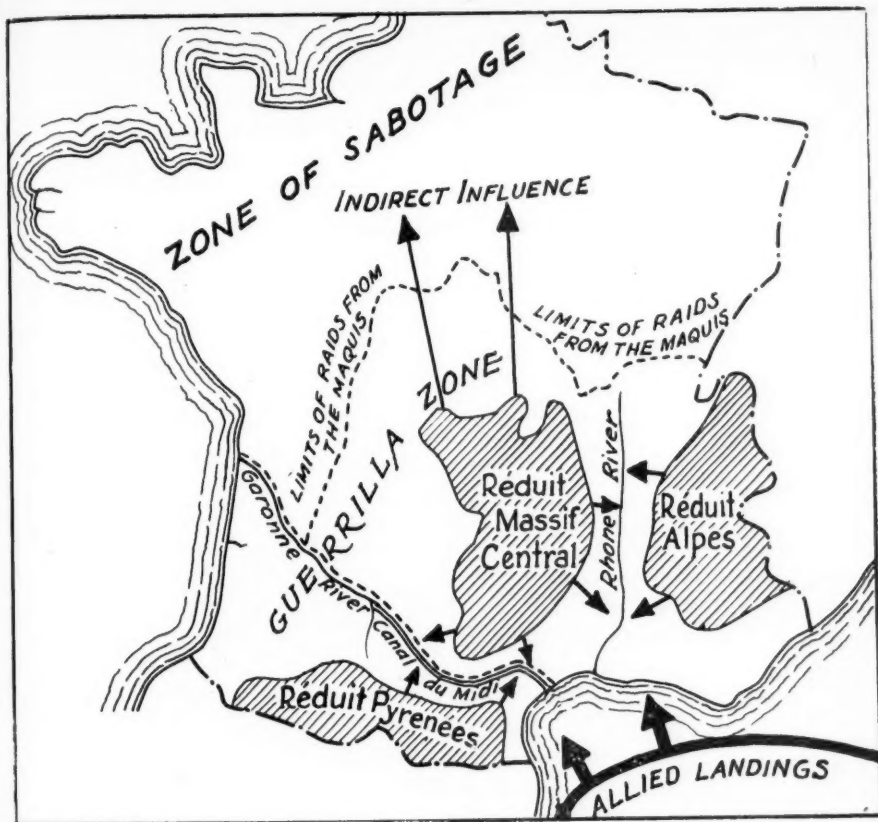
Anti-German attitude, it is interesting to note, works out in different ways according to national character and the geographical structure of the various countries. In the Balkans, the peasants and herdsmen for centuries carried on a desperate struggle against their Turkish overlords. With them, open, dynamic resistance is a tradition. It is quite

different in the western industrialized countries, where the worker substitutes the rifle and hand grenade by the subtler technique of sabotage. Different again is the mentality of the Czech people in the center of Europe, who, besides sabotage activity, rattle the nerves of their conquerors by means of passive resistance and feigned thickheadedness.

The geographical structure of the various countries exercises a decisive influence on the tactics of resistance. In Western Europe a well-developed network of communications of all kinds enables relatively wide areas to be guarded fairly easily by numerically small forces. This fact prevents the resistance movement from emerging from the underground into a mass action in the open. Its activity, therefore, consists of individual and small-scale sabotage. This, although carried out by individuals, is so extended by organization that it has the same effects as large-scale actions and results in considerable dislocation. Only in exceptional cases there is open conflict, mostly when the patriots are forced to protect and defend themselves actively against attacks. Every large-scale operation runs the risk of premature discovery and savage reprisals, which the inhabitants cannot escape because they have no chance of hiding or fleeing.

Nevertheless, this system of resistance has serious consequence for the Germans. All traffic, even on steam railways, is in the end largely dependent on the use of electricity. Signaling systems, points, turntables, lighting, transmission of messages on railways are mainly electrical. Every dislocation produces stoppages of traffic without the permanent way or rolling stock being directly attacked by force.

Resistance in mountainous country where open fighting is possible takes on quite different forms. To begin with, it is much harder for the occupying authorities to keep an eye on everything, which requires larger forces than the Germans now have available. The systematic search for the numerous hiding places demands numerically strong detachments, even if the fighting is no more than skirmishing. It is like looking for a



STRATEGICAL USE OF THE FRENCH RESISTANCE MOVEMENT (Only as an Example)

1. In the northern part of France the configuration of the countryside does not allow any other activity than underground sabotage.
2. On the other hand, the mountainous southern part of France is favorable to the development of guerrilla warfare which could affect favorably the Allied Armies' landing on the Mediterranean coast.
3. The penetration of the Allied Armies towards the interior is only possible in two directions:
 - (a) the Rhone Valley
 - (b) the defile of the Canal du Midi and through the Garonne Valley.

These two cuts become, at the same time, the main enemy communication routes with the South of France. By organizing the mountain ranges of southern France as

the Alps,
the Pyrenees,
the Massif Central,

in fortresses (*reduits*) of the French Resistance where the "maquis"* could hide a large number of its combattants which could very effectively harass by raids the enemy's rear in the Rhone Valley between the fortresses (*reduits*) of the Alps and the Massif Central, and in the defile of the Canal du Midi between the Massif Central and the Pyrenees, it would be possible to coordinate the strategic movements of the Resistance with those of the landed Allied main forces.

*Maquis—Originally terrain used by Corsican outlaws to escape persecution. These men were usually protected by the local population. The term is now used by the French underground to indicate their organization and their areas of operation, mainly in the mountains.—The Editor.

needle in a haystack. The hiding places provided by nature become rendezvous for the partisans and bastions of resistance in which they often assemble in bands several thousand strong. They carry out raids on the valleys, on enemy transport routes and equipment, or dumps of food, arms, munitions, and fuel, on airfields and command headquarters. In short, they keep the whole occupational organization in a continual state of alarm.

It would be wrong to conclude that there are fixed units as with regular troops. The leaders assemble their forces for swift action and then disperse in small troops in order to concentrate for a fresh blow in quite a different place; this makes the task of the occupation troops still more difficult, and it also explains why certain centers of resistance, have been established in the west in the Savoy Alps and in the southeast in the Balkan Mountains.

The fighting of the partisans in the east is an entirely different matter. This is real warfare, not spontaneous but carefully planned in advance, a prepared and organized action. In the great trackless, wooded, and often marshy lands, sections of the Red Army with arms and equipment were deliberately left behind to form a nucleus around which the local partisans could muster. Continuous collaboration and the supply of arms and food are organized simultaneously and the action of the partisans is in this way harmonized with the main front. The Russians have thus interpreted in their own way the maxim which Clausewitz formulated during the Prussian rising in 1813: "Through the reinforcement of the partisans by small detachments of the regular army, the commanding general remains master of the situation and can keep the popular rising under control and direct it according to his plans. Without this encouragement and support from the regular army, the citizens lack confidence and courage to take up arms. The more detachments the general in command assigns to this purpose the more enthusiasm they are able to arouse and the more they carry the masses with them."

Obviously, guerrilla warfare in itself is

never decisive. Partisans cannot oppose a regular army with any prospect of success. A decision results from battle between fully equipped armies. Indirectly, however, this result can be greatly influenced by partisan activity. In the approaching final phase of the present war every means must be fully employed, and one of the most essential is the correct and skilful use of existing movements and organizations of resistance.

At the moment of invasion the bulk of the German forces will be hurried from the interior to the coastal sectors to prevent an Allied landing. The interior of the country will to a certain degree be rid of troops and the resistance organizations will get freer play. The bands which assemble can at once act as advanced paratroops for the Allies, in so far as they are supplied with the necessary directions, weapons, explosives, means of communication, and so on. In any event, their task is not that of thoroughly organized paratroops, but thanks to their knowledge of the country and language and their close connection with the inhabitants, they are in a position either to take entire control of large tracts of territory or to throw them permanently into disorder to such a degree that they play into the hands of the advancing Allied forces. This would be especially effective in mountainous country where the enemy is limited to a few routes of traffic, mostly in the valleys.

It goes without saying that the German High Command has made its preparations for dealing with the population in the event of an invasion. The only question is how far these particular measures, worked out to the last detail, can really be carried into effect where the masses are absolutely hostile. The chief task of the Germans will be to prevent the population from escaping into the forests and mountains. If industrial and commercial life comes practically to a standstill, as may be assumed, the neutralization of the population becomes a very difficult problem indeed. Conversely, greater opportunities are open to the patriots. The relatively weak occupation forces left in the interior cannot

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intervene everywhere at once and can scarcely succeed in paralyzing the population.

Then will come the moment when operations can be carried out in the rear of the German Western Front similar to those which may be observed behind the Eastern Front or at present in Yugoslavia: swift punches, descent upon lines of communications, blowing up of bridges, the destruction of stores and telephone and signaling systems, false

alarms—in short, innumerable large and small enterprises, which, correctly led and guided, constitute a front behind the battle front.

Active resistance on the part of the population after years of oppression is certain. The problem is to organize and direct this resistance so that the underground organizations of the European peoples represent the first divisions of the army of liberation with which they form a single strategic unit.

Leaflets from the Air

Digested at the Command and General Staff School from an article in
The Times, London, 20 May 1944.

SINCE the first night of the war the RAF has been engaged on an unspectacular and little publicized activity—the dropping of leaflets—which has been the means of bringing home to the German people unpalatable truths hidden by Goebbels, and of bringing hope and encouragement to the peoples whose territories are temporarily overrun by the Nazis.

Today, leaflets and magazines are being dropped not only on Germany and occupied territory throughout Europe but also on such widely separated places as the Channel Isles and the jungles of Burma.

Leaflets were first dropped from the air on 15 October 1914, when a special pamphlet-dropping "raid" was carried out by No. 4 Squadron, RFC. In April 1917 the world's first aerial newspaper, the *Courier de l'Air*, was dropped over occupied Belgium. Today the *Courier* is being delivered regularly every week to the peoples of Belgium and France by British and American bomber crews, and each German-occupied country has its own special leaflets, newspapers, and magazines. In occupied territories they are eagerly read and handed from person to person, and often extracts are reprinted in the illegal newspapers produced by the underground movements.

The various publications give details of current Allied victories, of progress in the

fight against the U-boats, of Allied production, and of damage being done to the German war machine by the Allied air forces. In very many cases the facts are backed up by photographs. For instance, after the Allied victory in Tunisia the aerial newspapers gave the total number of German and Italian prisoners taken and showed a photograph of von Arnim arriving in England as a prisoner of war.

A four-page weekly illustrated newspaper, the *Luftpost*, is dropped over German cities with unflinching regularity, giving vital facts about the war. Once a month a thirty-two page pocket magazine, *Die Andere Seite*, informs German readers what the world's thinkers say about the war and its consequences for Germany.

In the early days of the war, leaflets were packed in bundles each weighing seven pounds, and over the "target" town a member of the bomber's crew had to cut the string and empty the contents down the flare chute. This somewhat clumsy method wasted much valuable time and thus exposed the crew to greater danger. Today there is an improved method, by which the seven-pound bundles of leaflets are automatically released when the bomb doors are opened, and a special device opens the bundles as they are falling and scatters them over a wide area.

HEADQUARTERS SERVICES OF SUPPLY

OFFICE OF CHIEF SURGEON
EUROPEAN THEATER OF OPERATIONS

26 June 1944.

Major General Norman T. Kirk, USA,
The Surgeon General,
United States Army,
Washington, DC

• Dear Norman,

I have likened our medical service—once, I think, in your presence—to a large ship, fully constructed but still on the ways. None of us knew whether it would float or not. However, the ship has now been launched and, since we have to date evacuated thousands of casualties, I feel that we can say that she has completed her trials. Whether she will prove seaworthy in the face of heavy storms is yet to be determined.

I have been in the field more than half the time since D-Day and have just returned from a tour of the First Army in France. I know you are very much interested and I shall try to give you a brief history of events up to the present:

On D-Day the landings on the westernmost beach were relatively easy, and severe resistance was not encountered until the troops had moved inland. This delay in the receipt of casualties enabled them to get in some medical installations; and the medical service for this landing was rather normal. On the eastern beach, however, the force encountered terrific resistance. They ran into a large German force engaged in maneuvers to repel invasion. The fighting was intense and casualties were very heavy. One division (The 1st Division. General Huebner, having himself been wounded in the last war, was thoroughly alive to the necessity for getting adequate medical service in early) had collecting and clearing personnel in the assault waves. This clearing platoon of the 1st Division cared for the casualties of the combat teams of two other divisions (one on either side) for 24 hours and did a magnificent job.

As you know, we placed one experienced surgeon on each LST. In addition, there were on each LST two young medical officers of the Navy and about 20 hospital corps men. This provision of expert medical service on the LST's saved many lives. Hundreds of casualties were carried from the place they fell on the beaches to the LST's and received their first medical care there. Perforating wounds of the belly were operated with splendid results. In any future operations of this kind, this provision should be considered absolutely essential.

The LST's have done a magnificent job, and I wish you would tell Admiral McIntire that his medical service has been simply superb in this operation. Captain Dowling, the Senior Navy Medical Officer with the Amphibious Force, and I made a trip of inspection together three days before D-Day and were content with the arrangements. I had a talk with him in France yesterday, and we both agreed that as a joint medical operation this one can be taken as a model of complete cooperation. I cannot say too much for the splendid work that Captain Dowling has done.

LST's carry from 150 to more than 300 patients in a load. In addition to the

medical personnel, the ship's personnel were of the greatest help and were intensely interested in this phase of their task. Machinists' mates made suction apparatus and other gadgets for the doctors; and members of the crew, when off watch, assisted greatly in feeding and otherwise caring for the wounded. The character of surgical work done on the LST's was the very best. These surgeons, exposed constantly to danger of attack from the time they left England until they returned, carried on without sleep and without flinching. We can be very, very proud of them, and there are, today, many American soldiers who owe their lives to them.

We also had five hospital carriers (small hospital ships) assigned to us. One of these struck a mine on D+1 but was able to make port. They were manned by a British merchant marine crew, and their medical complement was one of our hospital trains reinforced with a competent surgeon. They also did splendid work, but the total number they carried was less than 10 per cent of the total casualties evacuated. LST's carried about 90 per cent of the casualties.

The provisions for receiving casualties in the U.K. were more than adequate. An evacuation officer had been appointed for each area in which casualties were to be received. He had control of all ambulances and litter bearers. Depending upon the numbers to be returned to the various areas, the evacuation officer was given one to three ambulance companies and from a platoon to two sanitary companies for litter bearers. I had had these sanitary companies specially trained in litter bearing, and it paid great dividends. These negroes were as gentle as doves with the casualties, and I have never seen better ambulance loading. The ambulance traffic was beautifully handled. There was no confusion and never a minute's delay.

At each beach and port where casualties were received, field hospitals—either one, two, or three platoons—reinforced with surgical teams, were established in the immediate vicinity of the beach or hard to care for non-transportable cases. The very serious cases were admitted directly into these hospitals and given immediate care and treatment. Other cases were sent to transit hospitals within a radius of 20 miles of the beach or port. As soon as a case in a holding hospital became transportable, it also was sent to a transit hospital. Transit hospitals were evacuated daily by hospital trains and the casualties sent to general hospitals. The hospital trains were managed beautifully by the Evacuation Division of my office, and in every case a train arrived at a transit hospital in no longer than six hours after the hospital had requested evacuation. There has not been the slightest hitch in the chain of evacuation. Everything has been as smooth as if these people had done it all their lives.

The condition of casualties upon arrival in the United Kingdom has been surprisingly fine. Fractures have been well splinted. Shock has been treated on the LST's and carriers, and it is a rare patient who arrives in shock. Both whole blood and plasma have been plentiful in every medical installation from the clearing station to the general hospital, including LST's and hospital carriers. There has been enough penicillin to treat all the cases that required it, and the freedom of wounds from infection—even without treatment for as long as 5 days—has been a source of surprise to all of our surgeons. We have had very little gas gangrene, perhaps not more than 50 cases. Most of these have responded to the resection of certain muscles, and only a few have required amputation. Whether, as the British insist, penicillin is useful in gas gangrene, we do not yet know; but the fact is that the mortality and loss of limb from gas gangrene in our few cases has been lower than any of our surgeons had ever experienced.

I returned late last night from France. While there, I visited one collecting station (within 4 miles of Cherbourg and within a mile and a half of the front line), some 8 or 10 division clearing stations with their platoons and field hospitals established alongside, and about 12 evacuation hospitals. With regard to the use of the platoon of the field hospital for non-transportable cases, they are doing a splendid job. Their use is practically limited to perforating wounds of the belly and sucking wounds of the chest. In common with other theaters, we have found that head cases move well. However, this 100-bed platoon is entirely too heavy for this purpose. Even in those divisions which were suffering heavy casualties in the assault on Cherbourg, I did not see over 30 patients in any one of these platoons and the majority of them had from 8 to 15 patients. This is a great waste of means. We should develop a light surgical hospital of a normal capacity of about 25 beds and capable of expansion to 40 beds for this purpose. This little unit should have only command and nursing personnel and should always be reinforced with surgical teams. I recommend earnestly to you that such a unit be developed in the necessity of economy of means. The necessity for a unit to take non-transportables within the division area has been too well demonstrated to require any defense. However, the only unit that we have for this purpose at the moment—the 100-bed field hospital platoon—is entirely too large for the purpose.

Considering that almost all of them were being bled for the first time, the evacuation hospitals were doing a fine job. One encountered occasionally a unit that was trying to do too much surgery, thereby bogging itself down, but a little experience will cure this tendency.

Field hospital platoons were used as holding hospitals at air strips and beaches for the cases that were to be sent to the United Kingdom. There were very few delays at these evacuation points and patients were not being held very long there. Many cases were evacuated an hour after arrival, and few remained there as long as 12 hours. The field hospital platoon is ideally organized for this task.

We did not expect air evacuation before D+7 and that it would not be of much consequence prior to D+14. However, the Ninth Air Force got in there fast and we evacuated our first patients by air on D+3. It has now almost supplanted all other types of evacuation and we are getting many hundreds a day out by air. The air trip from the strip in France to the field in the U.K. is about an hour. There is a field hospital platoon at the air field in the U.K. to receive these patients and ambulances there to evacuate them immediately to fixed hospitals in the vicinity. A very, very few patients require resuscitation upon arrival at the air field in the U.K., and such are held in the holding hospital until they are able to be transported. This is also working very smoothly, and there have been, until this time, more planes available to us than we could fill.

Supply has been superb! At every medical unit I visited, from the collecting station to the holding hospital at the evacuation point in France, I enquired specially as to the status of supply. I did not get a single answer that was not to the effect that they had everything they wanted (which is always more than they need) and in ample quantities. For this fine situation I am deeply indebted to you for sending Colonel Voorhees and Mr. Hengon and with leaving Hays and Fenton with me.

We have now withdrawn all of the trained surgeons from the LST's, since all cases have been operated upon before evacuation and are in good condition. The two young naval medical officers are able to give them all the care that they need.

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However, at this time we are getting practically everything out by air and very few cases are going by sea. I am continuing to use the hospital carriers because I can foresee a great field of usefulness for them as soon as we develop the port of Cherbourg.

I would be very pleased if you would come over and see for yourself how things are going here. I am sure that you would find some things that we can improve, and I would be very grateful for your counsel. I do not need to tell you that you and your assistants are more than welcome in this Theater at all times.

With kindest personal regards,

Sincerely yours,

(Signed) Paul

Paul. R. Hawley
Major General U.S.A.
Chief Surgeon E.T.O.

The Jap and His Weapons

The other trait which struck me most in the Japanese soldier is the care that he takes of his weapons. If a criterion of the good soldier is his care for his arms, the Japanese is one of the best in the world. For one month I accompanied Japanese soldiers on the march on active service, living at their side, and every evening, at rest, I saw the same scene repeat itself. The Japanese private, as soon as he had settled down in the hut of some Chinese peasant, used to wash himself thoroughly. He then used to put on his *tabis* and set to work to attend to his arms, dismounting his rifle—cleaning and greasing all its parts, polishing the woodwork with a soft cloth to make it shine, and cleaning the bayonet with tissue paper.

Similarly, the Japanese officer used to put on his kimono and take his saber from its sheath with infinite precaution to preserve the fine edge of its blade. He then would tie a handkerchief over his mouth so that his breath might not tarnish the brilliancy of the steel, and amorously caress the naked blade with a white silk kerchief. Nobody spoke during this sword-cleaning process, which was in the nature of a rite. When the ceremony was ended, everybody came back to life again.

—Robert Leurquin, observer with the Japanese armies in Northern China and at Shanghai, in *Army Quarterly* (Great Britain) April 1938.

The plans of the commander look far ahead, but he prescribes only what is necessary for attaining the near objective. The commander who gives instructions without regard for this principle will be given the lie by events and will have to distribute counterorders. Now the counterorder engenders disorder and misunderstanding and undermines the confidence of subordinates.

—From Colonel Frick's *Tactical Breviary*,
quoted in *Revue Militaire Suisse*.

Bombing Is Our Business

LIEUTENANT COLONEL ROBERT S. MUNFORD, *Ordnance Department*
Instructor, Command and General Staff School

AIR power depends directly upon our ability to bomb the enemy, to destroy him with missiles dropped from our aircraft. This business of attacking enemy objectives with aerial bombs is man's most complicated means of waging war. The construction of the aircraft, their fragility and cost, the high degree of training necessary for their operation and their maintenance all enter into this complexity.

Due to the wide variation of activities that enter into a single attack and to the expense involved, success in accomplishing our Air Forces' mission is dependent upon detailed plans. These plans, to damage the enemy the most with the least cost to us, require all the ingenuity and skill we possess. They are based on the experiences of our many specialists welded together into a workable solution by staff officers highly trained in our "business of bombing."

The first consideration of a plan is the target. What is our objective? What is the target that when destroyed will affect the enemy the most? Indiscriminate bombing costs too much. Remember, a bomber costs money to build and to operate to say nothing of the cost of training and equipping her crew. But put aside the material things; why should we unnecessarily expose the lives of American soldiers to enemy flak and machine-gun fire? Each objective must be a vital spot, each bomb must count.

Information on the enemy's vital spots is obtained by our Intelligence Officer. He selects the aircraft factory at Blank, or the railroad yard northeast of Xville, or even that artillery position on Hill 315. Here we have an expert in our staff backed up by experts in higher headquarters all continually studying the enemy, determining our objectives so that they can be added up to ultimately render our enemy ineffective.

This expert not only tells us what factory but produces a photograph and indicates that Building No. 1 is the assembly shed and Building No. 2 is the instrument shop,

etc. He furnishes the pilot with a copy of this photograph and a map of the target area, consults with the Antiaircraft Officer attached to the staff, and together they locate the enemy defenses to be encountered. They list the type of guns, the effective height of the flak, and then determine the direction of approach to the target that will meet with the least enemy antiaircraft interference. All this information is neatly bound in a book called an objective folder. This folder gives the pilot all the information necessary to make a successful attack.

The photograph was the product of a reconnaissance mission. From these photographs and the men highly trained in interpreting them come much of the Intelligence Officer's information.

After this careful consideration of the target and its effect on the enemy, what next enters our plan? Since weather is still a handicap for the operation of aircraft in general and especially of bombing, the weather man is found to be a most important individual at any parley planning a bombing raid. This soothsayer of the meteorological science with his assistants, gathering information from far-flung weather stations half around the globe, must make a decision for each bombing mission, a decision upon which rests not only the probability of destroying the enemy objective but of getting our airmen safe on the ground again at their home bases. If he estimates that visibility will be poor in the area of the target selected by the Intelligence Officer but will be clear farther south, another vital target must be selected in the clear area or the mission must be canceled. Fog or poor visibility still plays havoc with the landing of our aircraft, although instrument landings are becoming more frequent.

In addition to estimating the visibility at both ends of our mission and the conditions along the route, the weather man provides other information to assist in the bombing itself. The direction of the wind at the tar-

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get, its velocity at various altitudes, the barometric pressure, and the temperature all enter into our bombing efficiency. An error of a few hundred feet in altitude or a few miles per hour in the speed of our aircraft will cause large errors in the placing of our bombs. The information given by the weather officer is supplemented by data obtained from instruments on each aircraft. Now we even have instruments that permit bombing through clouds, but the precision bombing for which the U. S. Air Forces are famous still requires visual location of targets.

The next phase of our plan for this business of bombing brings us to the bomb itself. The selection of the bomb that will be most effective against this important enemy installation is our problem. In addition to the selection of the right bomb, the right fuze must be picked that will detonate the bomb at the point in the objective at which its explosion will be most damaging. Many types of aerial bombs have been developed, each for destruction of a specific type of enemy target. Fuzes now allow us a wide range of selection with delays of a split second to several days. The development of new aerial bombs and their fuzes is continuing, and improvements and modifications in our present matériel are also being made to meet the requirements of our bombardment planners.

We look back on many horrible examples of the misuse of bombs: one from the days of Bataan, when an officer flying a P-40 sank his first Jap destroyer—on his second trip. His first try was with a 100-pound bomb which only shattered the superstructure, but his second was with a 500-pounder. Moral—"Don't send a boy to do a man's work," and there are many such examples. Experiments are continually being conducted at our proving grounds and committees composed of military specialists and scientists have been formed in most theaters for the study of this phase of our operation. As our experience grows, so does the effective selection of our bombs. The results of these studies and tests are passed on to the planning staffs. Here the A-3 assisted by his Ordnance Officer and Bombing Officer an-

alyzes the objective, considers the bomb-carrying capabilities of the aircraft, and arrives at a conclusion as to the type of bomb and the particular fuze that will obtain maximum damage.

The next question is "How many hits will be required to destroy this installation with the bomb we have selected?" Here again the experience of previous raids and studies by our scientists give us the answer. This question is closely followed by "How many bombs must be dropped to get the number of hits desired and how many planes will it take to carry those bombs?" The effect of the bomb is important but is, of course, entirely dependent upon the bomb being placed on the target. Bombing probabilities, the probability of hitting a small target from five miles up, are affected by many factors. Of course the altitude is of primary consideration; the farther away from the target the less the probability of a hit, and this distance also increases the effects of the other variables.

The weather is important and so is enemy opposition. Flak has spoiled many a bombing run, and after we find the altitude and direction of approach where it will cause the least interference, we must allow for its effect on our mission. Interspersed with these factors come the basic considerations of the size of the target and, the most important of all, the skill of our pilots and bombardiers on previous raids. Only after a careful examination of all this information can the number of bombs be selected. This immediately gives us the number of planes required to transport these bombs to the target. But other considerations come up. Are sufficient aircraft available to provide one another security against fighter attacks? Or do we have sufficient aircraft to make this attack? Out of this caldron of ideas and facts, each must be weighed, considered, chronologically analyzed, and cataloged to fit into the plan of a bombing strike.

These details and many others provide the foundation for our tactical plan of maneuver. Then the A-3 consolidates this data and completes the plan. Time over target,

bombing altitude, axis of attack, initial point, altitude, time and place of rendezvous with our fighters, route out, route back, and other details must be carefully worked out to complete our plan. The planning of the attack is based on the experience, the training, and the ingenuity of these many students of air warfare. They are the experts of the bombing business.

Now let us consider some of the other phases of this business of bombing. What about the supply and maintenance? And by no means should we forget our fighters. When we learned a few months ago that our fighters had increased their range to permit them to be "over Berlin," what did that mean to our business? Naturally, that our bombers would be protected from enemy fighters and that their probability of reaching the target was increased. This in turn meant that fewer bombers were needed to do the same job of destruction, but better, that the same bombers could do much greater damage. The fighters are a vital element to our plan and do excellent bombing themselves when circumstances permit.

Supplying the aircraft, the gasoline, the bombs, and 500,000 other items necessary to "keep 'em bombing" is no minor task. Neither is the repair and routine maintenance of our aircraft and mending the wide assortment of vehicles, weapons, tools, parachutes, life rafts, clothes, etc., needed to operate this business. A large percentage of this complex operation is controlled by a separate command of the Air Force called the Air Service Command.

Here are the depots and service centers with their extensive maintenance and supply facilities, manned not only by Air Corps personnel but by personnel from the attached services as well. Nevertheless, all are trained specialists in the field of Air Force supply and maintenance.

The maintenance of Air Corps equipment includes overhaul of engines, patching flak holes, inspection and repair of the instruments so necessary for controlling this bird of the skies and for precision bombing, and the other infinitesimal tasks from the com-

plete rebuild of an aircraft to a routine inspection. Its supply goes from the tons and tons of gasoline needed, through quantities of miscellaneous aircraft spare parts and equipment, to the aircraft itself.

The attached services provide many of the essentials of our business. The engineers build the runways, camouflage the revetments, and construct our buildings. The Signal Corps operates our communications net and repairs our radio equipment. The Ordnance men supply our bombs and repair our vehicles and weapons. The quartermaster passes out those all-important rations while supplying hundreds of other items. And so on down the list, each a part of the Army Air Forces because it adds an essential part to our business of bombing.

Supply and maintenance are two items of utmost importance to any plan for a bomber strike. An aircraft, non-operational or one without gasoline or bombs, is a pretty useless piece of equipment from the viewpoint of our mission—destruction of the enemy.

Consider now the wide variation in the factors affecting our operations, the specialists in widely separated fields of endeavor grouped into a single organization called the Army Air Forces. Never was an organization more specialized or complex. It is specialized because the intricacies of each phase require a high degree of training, and only after a long period of experience and study can an officer render useful service in even one of these specialized operations.

The effect of this wide scope of activities on our staff officers, the planners and coordinators of our operations, is easily foreseen. The staff officer must be trained not merely in the wide scope of his own specialty but from the much wider viewpoint of operations as a whole. He must be able not only to visualize the importance of his own job but to understand how his operations will affect the activities of other members of the staff. A general knowledge of the operations and duties of each member of the staff is essential. This knowledge must include the information that can be obtained from each staff section, and equally im-

portant, the information that each staff section requires from him. This exchange of information is the basis for all staff procedures. Its importance is emphasized in the Air Forces by the many phases of operations.

These many and varied details must be integrated into a single coordinated plan of attack, a plan of striking where it affects the enemy most vitally and with a force balanced by all considerations for success.

Airborne Invasion of North Burma

From *The Sphere* (Great Britain) 8 April 1944.

In one of the most brilliant air operations of the war, British and Indian troops have been landed by moonlight 200 miles behind the Japanese lines in Burma. By this daring assault, a strong British force has split communications between the enemy's northern and southern armies.

The operation was made possible by the use of gliders, which flew in with engineers and their equipment, jeeps and machinery, to prepare strips for the troop-carrying planes. The gliders were flown by men of the American Air Commando Unit. In a few days, the main strip was completed—the first time in history that aircraft have been maintained on an airfield behind the enemy lines. The first gliders were towed off at dusk. As the almost full moon rose, the Dakotas roared down the runway, and, turning neatly, the long nylon tow-ropes were hooked up. For the next few hours the air base was a maelstrom of dust and noise as Dakota after Dakota screamed its way down the long strip with gliders speeding behind.

Shortly after nine p.m. the first Dakotas reached the area; down below them the long, grassy swath cut in the jungle, and on either side mountains towered, making a deep valley in this remote part of Burma.

The first swept in at 100 miles per hour

and the wheels touched down on a seemingly smooth surface—but it was deceptive, for what from the air looked so smooth and grassy was ridged with paddy mounds, and teak logs were everywhere hidden in the lush growth. The glider had its wheels ripped off in the first fifty yards on the ground, and, bellying on its steel skids, rushed down the paddy field until it slithered to a stop. Glider after glider came in, many of them crashing their under-carriage. The troops poured out and were organized into patrols, which were moving off within ten minutes of the landing. Overcrowding soon became a major problem. Shortly after eleven p.m. it was decided to stop the last wave leaving the home base. By midnight all the gliders destined to arrive had "made it." By two a.m. work had started on the strip for heavy troop-carrying planes. Through the night the work went on, and by seven o'clock the strip was sufficiently forward for light planes to land, and the first came in at eleven. Still the work went on, and at seven the next night a complete airfield, capable of carrying big, laden planes, was ready. At seven-five the first troop-carrier landed, and for two hours there was a landing or take-off every forty-seven seconds. Thus a major British force was landed.

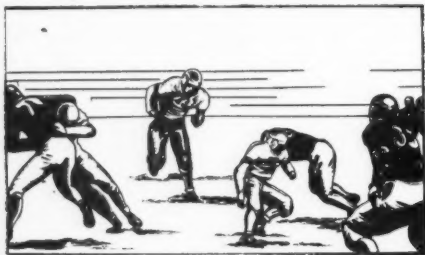
The main duty of the commander is to be the sustainer of the morale of his troops. In many situations, nothing else counts. The iron will of a resolute commander, and his personal example, urge the forces on and maintain hesitating men at their posts. In a desperate situation, it maintains intact, and till death, their will to fight.

—From Colonel Frick's *Tactical Breviary*,
quoted in *Revue Militaire Suisse*.

The Infantry-Artillery Team

MAJOR JAMES H. PRESCOTT, *Field Artillery*
Instructor, Command and General Staff School

THE success which our ground forces have had in all theaters of the war has been largely due to the close cooperation within our infantry-artillery team. Like the "four horsemen" of the gridiron sport, the infantry component of this team calls the plays, carries the ball, and makes the gains.



The artillery "seven mules" by means of its firepower blasts holes in the hostile line, reaches into the secondary, and assists the infantry to make the greatest possible gain.

Our infantry-artillery teams overseas have learned—and quickly—the necessity for getting together in the huddle before the play so that each knows the signals and the plans of the other. Too often, real cooperation has developed only under the pressure of enemy fire and at the expense of needless casualties and wasted opportunities. "Infantry-artillery cooperation" has been a high-sounding catchword during training, and too often the real links of teamwork are forged only in the heat of battle.

It is not necessary to tell troops that have been in active operations the importance of close cooperation between infantry and artillery. Nearly every infantry unit that has been in action has appreciated its artillery support, and individual doughboys are frequently bragging that "their" artillery is the best in the division. Artillery units much prefer to be placed in support of their teammates, and forward observers speak highly of the help given them by the infantry. The

fear and respect which both Germans and Japs have for the skill and courage of our infantry and the ever present scourge of its supporting artillery are testimony to their teamwork.

Is this teamwork being developed between infantry and artillery units during training in this country and being perfected in maneuvers? Unfortunately a recent directive from Headquarters, Army Ground Forces, based on maneuver observations "indicates that infantry-field artillery cooperation and coordination show little, if any, improvement and continue to be unsatisfactory." Specific faults noted show in many cases a misunderstanding of the principles and relationships that make for real teamwork.

Effective cooperation between infantry and artillery is not a nebulous attitude of well wishing, as any number of officers who have been through the experiences of the Solomons, North Africa, Sicily, Italy, New Guinea, and elsewhere can testify. Rather it is a result of real and definite coordination, liaison, and a sincere appreciation of the problems of the companion arm.

The division commander assisted by his staff coordinates the team by assigning specific missions to both the infantry and artillery units. Great reliance must be placed on the division artillery commander, who in his dual role of commander and staff officer plans for and supervises the employment of the organic artillery and any which may be attached. Since infantry-artillery teamwork begins at the division level, the division command post and that of the division artillery must be located together. Overseas divisions have quickly found the necessity for this, and follow this principle even though it sometimes means foregoing a desirable location in order to select one that permits better control of the artillery battalions. The question of centralized as against decentralized control of the artillery arises frequently. The advantages of the former are great

when practicable. In Italy it has been habitual to mass the fires of six or seven artillery battalions on one target, providing good interference for the ball-carrying infantryman, and in one instance the fires of nine hundred artillery pieces were massed on a single target. Occasionally, however, centralized control has been retained too long—when communication difficulties interfered with the proper exercise of control. Such a case occurred in the early days of our operations in Guadalcanal. When the division reached its initial objective, one regiment was sent to cut off the retreating Japs by a wide envelopment. Its direct support artillery battalion displaced with it to continue support but was ordered back so that it could be used under "centralized control." As a result, the regiment lost the close support which it needed and was greatly delayed in reaching its objective.

G-3's enthusiasm for coordinating the infantry-artillery team within his division must not cause him to interfere with the tactical function of the artillery commander. In one division in Italy the G-3 set up a "restraining line" for a defensive operation, a line short of which the artillery was not permitted to fire. This was as though the ball carrier told his blocking back not to bother with any opponent who might attempt a tackle behind the line of scrimmage, and overlooked the ability of artillery to bring accurate fire on enemy forces which break through into our positions. As a result, observers reported many targets which could not be taken under fire because of being short of the "restraining line."

Between the infantry regiment and its direct support artillery battalion, teamwork begins with command liaison—direct personal contact between the two commanders. It is desirable, of course, that the infantry regimental and artillery battalion command posts be located together in order to facilitate the close contact between commanders. Much of the time, however, this has not been possible in Italy. For communication and other operational reasons, it is necessary that the artillery command post, which contains the

fire direction center, be set up near the batteries, and suitable battery positions both in Italy and in the Southwest Pacific are not easy to find. Furthermore, the infantry regimental command post is usually displaced forward by bounds of a mile or two in a slow, steady advance, while the artillery command post makes displacements of six to eight thousand yards. Even under these circumstances, however, the command posts should be located together at every second or third displacement.

Even though the command posts are not together, the artillery commander usually accompanies the infantry commander on his reconnaissance and remains with him while he plans and issues orders for the operation. During this planning phase, the general plan for artillery support is agreed upon. Among other things, the infantry commander must decide which of his battalions is to receive priority in artillery support—at least initially—for an artillery battalion generally can effectively support only one infantry battalion at a time. Usually in the Italian campaign, however, enough corps artillery has been available to give each attacking infantry regiment the support of several artillery battalions.

Another problem which must be settled by command liaison between infantry and artillery commanders is a possible conflict between the location of elements of their units, so that part of the artillery and the regimental reserve, for example, are not assigned to the same area. In Italy, where position areas are at a premium, one case was observed where both an infantry cannon company and an eight-inch howitzer battery had planned to occupy the same position. This incident illustrates, incidentally, the close support given by corps artillery.

The second means of contact between the infantry and its supporting artillery is the artillery liaison officer, who is the artillery representative with the infantry battalion commander. The liaison officer must be much more than a "middle man" to handle requests for fire support. In the jungles of the Southwest Pacific, good liaison officers have

been invaluable in suggesting to infantry commanders ways by which artillery could assist, as well as tactfully pointing out that certain requests for fire could not be properly undertaken. Through its liaison officers, artillery has frequently indicated the objective to the infantry by means of smoke. On occasions, infantry commanders have lost track of the map locations of their front-line elements after a day's advance through the trackless terrain of the jungle, and the liaison officer has been able to orient them by means of the last artillery concentration fired in front of the advanced units.

The third means of contact between the infantry and artillery teammates is the artillery forward observer. Normally, one forward observer is furnished by each artillery battery. In maneuvers and other training in this country the artillery is sometimes guilty of sending forward as observers inexperienced officers or those "who can be most easily spared." This is fatal to infantry-artillery teamwork. Nothing can more quickly undermine the faith that the infantry has in its supporting artillery. Units which have been in combat have used their best officers, frequently battery commanders, as forward observers. Eighty to ninety percent of our artillery fire in Sicily and Italy has been observed fire, a large part of which was conducted by forward observers.

In most divisions in Italy the activities of the forward observers are coordinated by the appropriate liaison officer. Too often the impression is gained that the forward observer will stay with a particular infantry company or other unit. Our doctrine teaches, and experience in Italy has shown, that the most efficient use of forward observers is to assign them a definite zone of observation, and so they will go where they can see best. The Germans are keenly aware of the importance of observation. In the early stages of the Tunisian campaign, German forward observers continually infiltrated at night to vantage points on our flanks or rear from which they directed harassing fire on our installations during the day.

In accordance with the flexibility of artil-

lery support, a forward observer may adjust the fire of any of several battalions, including corps artillery, and less than half of the time will he adjust his own battalion. In one case an adjustment begun by one forward observer was interrupted by a cloud passing between the observer and the target. Another observer whose view was not obstructed completed the adjustment and brought effective fire on the target. In the jungle and under conditions of poor visibility, forward observers have become adept at adjusting fire accurately by sound alone against close-range targets.

An evidence of the teamwork developed overseas is the increasing number of cases of artillery fire being adjusted by infantry personnel. In the 3d Infantry Division as many as fourteen missions in one day have been adjusted by the infantry, noncommissioned officers as well as officers. Since observation of fire and the establishment of communications to observers is primarily an artillery responsibility, the assumption of part of this function and the use of their own signal communications to accomplish it shows the infantry's willingness to go more than half way toward cooperation.

Thus, through command liaison, liaison officers, and forward observers, the artillery is equipped with the physical means for cooperation. The infantry contributes a more intangible but none the less real share toward cooperation through its consideration of the artillery's needs for the best position areas, close-in defense of positions, protection of observers and communications, and frequent assistance in adjusting fire.

One of the best ways to build up the spirit of cooperation and mutual respect between the infantry and artillery during training is for at least the officers of each arm to become familiar with the general capabilities and limitations of the weapons and tactics of the other. Too often artillery fire is called for on a point target—for which it is not as well suited as infantry heavy weapons—while infantry antitank guns or mortars remain idle nearby. Infantry is prone to ask for too much fire at one time on a target—eight to ten

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rounds per gun—rather than letting the artillery fire three or four rounds and then come back as necessary. Most of the casualty effect of artillery surprise concentrations is accomplished by the first two or three rounds. On its part, the artillery too frequently forgets the ammunition resupply problems of the infantry mortars, which makes difficult the attack of area targets. Artillery is always anxious for protection by infantry against hostile infiltration, and yet frequently fails to consider the infantry dispositions when setting up its close-in defenses. Infantry must appreciate the unavoidable dispersion of artillery fire that causes occasional rounds

to fall on our troops when attacking targets close to them. Finally, artillery must realize that its responsibility for support is continuous, that displacement must be made by echelon and in time to maintain close support, and that the first consideration in selecting position areas is the ability to render adequate support regardless of the defilade or protection afforded.

Through an intelligent use of the liaison means available and through sincere cooperation, the infantry-artillery teams now in training can avoid the costly losses of those units overseas which learned the hard way the importance of teamwork.

Russian Tactics

From an article by Cyril Falls in *The Illustrated London News* 1 April 1944.

THE Russians have mingled hard fighting with bold maneuver. When they have driven in a wedge they have driven it as far as it would go, without regard for the flanks. Therein lies one of the greatest advantages of the offensive carried out by enterprising commanders and troops. When the front is generally moving forward such thrusts involve far less danger to the army which makes them than during a general retreat. . . . It is also to be noted that, when they could avoid doing so, the Russians have not butted their heads against the strongest

centers of resistance. They have gone past and around them. They have sought out the softer spots and punched a way through there. It was between Tarnopol and Proskurov that Marshal Zhukov pierced the German front and swept forward to the Dniester, though in this case the whole of that front was strongly defended by the enemy, and it was only relatively speaking that the Russians found a soft spot. Marshal Koniev, in particular, seems to have proved himself a master in the bold exploitation of superior strength and mobility against an enemy showing signs of shakiness.

LCT's to Ferry Mechanized Equipment

In the final phases of the Sicilian campaign the ground forces on the north of our line found their progress seriously impeded by enemy demolitions and mine fields. The heavier mechanized and motorized equipment could not keep up with the advancing infantry.

Building bridges and constructing bypasses is laborious and time-consuming. Consequently, a request was made to the Navy for LCT's to ferry the heavy equipment around the obstructions. Five LCT's were allocated for this purpose, and thenceforth

proved to be invaluable, particularly in bypassing Cape Calava during the approach to Messina. Here the main road ran through a tunnel which had been destroyed by the enemy, and the movement of our heavy equipment by road in this area had come to a standstill.

There can be no doubt that LCT ferrying operations served to minimize the effectiveness of the enemy's demolitions. They permitted pressure to be applied more rapidly than anticipated and therefore contributed materially to the success of the campaign.

Information and Historical Service Unit for Combat Zones

LIEUTENANT COLONEL BYRON L. PAIGE, *General Staff Corps*

THE United States Army is rightly called the "best-equipped army in the world." The basic tactical doctrine under which it fights has been proved sound in the deserts of Tunisia, in the jungles of the Southwest Pacific, and in the mountains of Italy. However, during the course of a war the equipment of an army must keep pace with changing enemy tactics, with changing tactical conditions, and with the results of research and experiment both in the theaters of operations and on the home front. Basic tactical doctrine must be translated into training programs not only for troops awaiting shipment to the theaters but for troops who have already seen combat. Such training programs must also keep pace with changing conditions.

DETAILED COMBAT INFORMATION NEEDED

The ultimate test of our equipment and training is the test of battle, and it is from the battlefronts of the world that the War Department must receive the information on which to base the redesign or development of equipment and the training of troops destined to fight on those battlefronts.

The greatest potential source of the type of information desired is the mass of reports rendered by units in the field. There are many reasons, however, why these reports leave much to be desired. For one thing, the more actively a unit is engaged, the less time it has to write records and reports. Then too, there is the natural tendency for unit commanders, impressed with the necessity for brevity and conciseness, to limit their reports to an outline of major events, thus emasculating them automatically of the very detail so urgently needed by the War Department.

This same lack of detail, reflected in unit historical reports, threatened to make impossible the compilation of adequate unit histories. War correspondents were getting good, detailed accounts, but their coverage was spotty; there was need for more com-

plete official data for release to Public Relations agencies.

NEW ORGANIZATION APPROVED

A War Department study of these various deficiencies led to the establishment of Tables of Organization and Equipment for units of an Information and Historical Service designed to increase the flow of information on the front-line combat activities of ground troops.

Table of Organization and Equipment No. 20-12S, dated 2 April 1944, provides for a headquarters consisting of a commander; an executive; historical, tactical, and photographic editors; a tactical reporter; rewrite personnel; and administrative personnel. The headquarters detachment includes a magazine and feature unit, a radio unit, and a monograph unit. The total headquarters strength is ten officers and fourteen enlisted men.

Functioning under this headquarters will be a variable number of four-man "assignment units" of two types: combat information collecting units consisting of two reporters, a motion picture cameraman, and a news photographer, complete with $\frac{1}{4}$ -ton truck and $\frac{1}{4}$ -ton trailer; and historical units consisting of three historical reporters and a news photographer, also with transportation.

BASIS OF ASSIGNMENT

The contemplated basis of assignment is one headquarters unit per army, independent corps, or major task force, with one combat information collecting unit for each front-line division or separate combat team plus at least one in reserve for emergency use; about three historical units should suffice for an army.

MISSION

The primary mission of the complete unit will be the collection, preparation, and forwarding of information of all kinds to include moving and still pictures of public or general

interest concerning combat activities of the organization to which attached. Certain personnel included in the unit are charged primarily with the collection and forwarding to the War Department of information of historical interest; others are charged primarily with the selection of information and photographs of particular training or technical value for transmittal to the War Department. Operations Division, WDGS, will accomplish the dissemination of suitable material to other theaters; meanwhile, all material will be available for study and appropriate action by other War Department agencies.

HOW IT WORKS

The SOP for the Information and Historical Service states, in part:

"News and feature material will, whenever possible, be prepared by the individual of the information collecting unit who obtains it and will be forwarded by the most expeditious means to the headquarters detachment. The personnel in the headquarters detachment will review, edit, and prepare any required additional copies of the material. Copies of such material will be reviewed by magazine feature, tactical, and historical personnel of the headquarters detachment and forwarded through theater headquarters by the most expeditious means for final action by the base censor. No prior censorship will be required.

"Moving and still picture films will be transmitted, by the most expeditious means, to the Signal Corps facilities which are available to the army, independent corps, or task force. In the absence of Signal Corps facilities mentioned above, material will be sent to the next higher headquarters for processing. The Signal Corps facilities should give the work the highest priority after tactical requirements have been accomplished.

"The historical editors will review all material received, extract information pertaining to their function, and transmit such material through theater headquarters to the appropriate War Department agency.

"The tactical editor and reporter will secure appropriate material from all available sources.

"Magazine feature personnel will review all material received and detail writers to develop material that has potential magazine feature value.

SUBMISSION OF MATERIAL

"All material, both news and photographic, will normally be prepared in final form suitable for use by the various publicity media before being forwarded by the information collecting unit. Such material may be released for publication by theater agencies in accordance with War Department policies. In general, material will be forwarded as follows:

"(1) Material believed to have value for any of the types of publicity media, through the theater commander to the War Department Bureau of Public Relations after approval by the base censor.

"(2) Material believed to have historical value, through channels to the Adjutant General in accordance with AR 345-105.

"(3) Material believed to have tactical training value, direct to War Department, Attention: OPD (Current Group).

"The most expeditious means of transmittal available justified by the importance of the material concerned will be used. All echelons of command will issue necessary instructions to insure the most rapid handling of news material permitted by the facilities available and the military situation."

NO SUBSTITUTE FOR UNIT REPORTS

The establishment of these Information and Historical Service units in no way lessens the responsibility of units for rendering operational and historical reports in conformance with regulations. On the contrary, it is to be hoped that unit commanders will make every effort to render detailed reports covering performance of tactical employment of small units, and improvised methods or matériel, in the knowledge that such reports are carefully studied and may well be the basis for changes or improvements in equipment or training for the entire Army.

The tremendous appetite of the War Department for detailed combat information

will be hard to satisfy, yet only through such detailed information can the needs of troops in combat be recognized and properly pro-

vided for through equipment and training. Only thus can the combat lessons learned in one theater save lives in another.

A Jungle Aid

Extracts from an article by Major L. M. Mason, USMC, in
The Marine Corps Gazette May 1944.

THIS article is written to pass on something different that was tried in my battalion and many times proved its worth. Each officer and enlisted man was issued a ten-foot length of quarter-inch line and instructed on how to whip the ends and stain it green. This was always carried in a neat coil on the belt or pack. The uses it can be put to are innumerable and new ones are always presenting themselves. Besides lashing equipment, improving stretchers, lashing spars, crossing streams, and scaling heights (to mention a few) we used these lines to great advantage in keeping contact in moving through the jungle at night without lights.

Moving noiselessly at night through the jungle was next to impossible. The men couldn't see each other and were forever losing contact and getting lost. To help keep contact and to bolster their morale, which is not at its highest pitch when one is walking seemingly all alone in the jungle blackness, the men would keep verbal contact. This verbal contact grew into quite a din especially in the still of the night. Our ten-foot lines finally solved this problem. Each man passed one end of his line through the left suspender ring of his pack and tied the other end to the loose end of the line on the man ahead of him. This gave you a column of files, which is the easiest way to move through the jungle at night, all on one line. An individual could not get out of the column, he had ten feet of loose line to move on and more important had both hands free to carry his piece, fend off branches, and keep his balance—that last point is not to be overlooked if you've ever tried to walk in the jungle in blackness. In

case of a sudden fire fight the line would be cut with the knife nearly everyone carries, or with the bayonet. The line is passed through the left ring instead of the right ring to assist in such an eventuality. A word of caution: if care is not taken you are apt to end up with one or two men way out in front and the rest of the platoon (not recommended for units larger than a platoon) bunched up like a string of fish on the end of a line. This condition can be avoided if each individual will not allow a knot to pass either way through his ring. With ten feet of line leeway, a man can make his own way comfortably in the dark with full confidence of not being alone. He does not have to speak a single word. Should he stumble and fall he does not pull anyone else down because the whole line is free to slip through each ring. Should the leader set too fast a pace for any individual, he holds fast on the line and if everyone is trained not to allow a knot to pass through the ring the whole column is stopped without an order. The leader of the group must realize that the majority of these halts are merely for individuals to close up one or two paces and so do not necessitate a long halt. The leader should push on after a few seconds' halt and if the necessary adjustment has not been made another tug on the line will quietly stop the column.

For night work alone the piece of line proves its worth but you'll be surprised at the multitude of other uses you'll find for it. If individuals can be indoctrinated with the importance of that ten-foot line as a piece of equipment you will find yourself more than repaid for your effort.

Signposts for Battle

MAJOR GENERAL ORLANDO WARD, U. S. A.
Commandant, Field Artillery School, Fort Sill, Oklahoma.

THE army commander of World War XIII sits comfortably in a well-protected command post and scans the flow of battle on a television screen. The enemy guns on the bluff above the river are doing too



much damage. He pushes button No. 5. He turns a dial. The officers on the field, through their special glasses of which the enemy has none, watch a long finger of light hover in the air and then come to rest in the shape of a vivid No. 5 plastered against a bluff.

Colonel Jones of the Infantry knows that numbers 1 through 10 are reserved for the chief and that red means "Infantry take note." The bluff the General has indicated with his red 5 is indexed on the Colonel's map as No. 14 (numbers 11 through 20 being assigned to the Colonel and his officers for indexing the terrain on their front). The Colonel flashes a red 14 on the bluff and barks a radio order. His batteries fire. "And that," says the General, "is that," as he turns his attention and dial elsewhere.

It will be very convenient, years hence, when a commander can erect neon signs on battlefields within the enemy lines visible only to his specially bespectacled officers. Physically, this is not possible at the present time. Until science makes it so, commanders still will be forced to transmit directions

through the use of coordinates which, because of the demands of secrecy, generally arrive late and garbled.

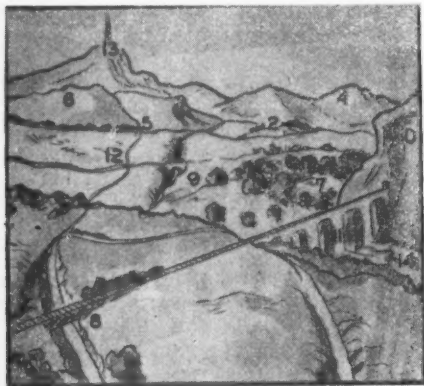
Mentally, even at the present time, it is possible to erect these neon battle signs. The battle chief should erect them, not only in his own mind but in the minds of his commanders, by discussing with them the features of the terrain which are of such tactical value that they warrant neon signposts. The man who plays chess, checkers, monopoly, or backgammon knows the danger points on the board (terrain). How much more important is it in the game of war when the board is forever different?

Having discussed with his commanders what he and they consider the critical features of the board and having arranged for the erection thereon of numbered neon signs, the commander is prepared to play the game, provided he is familiar with the technique of the moves of the men. His subordinates, using the same device, can erect signs on terrain features which intimately concern them, which will likewise expedite their play.



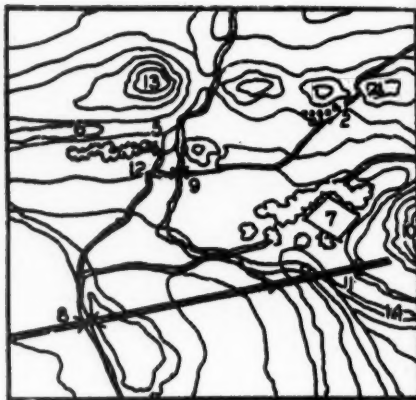
Three things have been accomplished: (1) a thorough map reconnaissance, (2) prethought on the critical terrain features, and (3) an indexing, readily usable in the clear, for the maneuver of troops, supplies, and fire.

It is therefore recommended that corps, division, and combat team commanders re-



serve unto themselves a block of numbers or letters. They should then, in conference with their next subordinates, index the critical, easily identified, and important terrain features of the contemplated battlefield. The subordinates should do likewise, and so on down to include the battalion. Thereafter the

commanders utilize these easily identified prominent points in order to maneuver fires, troops, and supplies, as well as to report their own troop locations in connection therewith. Coordinates are used as a last resort and for meticulous identification of small



points not sufficiently near to the indexed features.

Major General Kovpak, Soviet Guerrilla

From *Information Bulletin*, Embassy of USSR, Washington, D.C.

FOLLOWING the failure of their offer of 500,000 marks for the head of Sidor Kovpak, the Ukrainian guerrilla chief, the Germans put up the following notice in occupied towns and villages: "He who apprehends guerrilla commander Kovpak and delivers him to the commandant will be paid by the bank gold equal to the weight of the head of this guerrilla chief."

Kovpak, who is 62, fought as a guerrilla during the Civil War. In this war, beginning with only a few dozen men, he has built up a full-sized army with cavalry, tanks, artillery, and mortar units. In May, 1942, he was made a Hero of the Soviet Union, and a year later was promoted to the rank of Major General.

The remarkable scope of his activities may be judged from the results of one of his engagements with the enemy. To protect their

communications from Kovpak's guerrillas, the Germans brought up large forces of infantry supported by aircraft, tanks, and artillery. Planes bombed every "suspicious" objective, from villages to trappers' huts. Then the German heavy guns gave the forest a forty-eight-hour artillery preparation, before the infantry attacked.

When the German tommy gunners arrived at the edge of the forest they found a notice nailed to a tree. It read: "We've gone. We'll lick you somewhere else."

True to their word, the guerrillas struck at this punitive expedition from another direction and killed 1,300 Germans. While this operation was in progress other detachments of Kovpak's men derailed eleven locomotives and wrecked 286 cars laden with troops and munitions.

Selection of Personnel for Overseas Duty in the Army Air Forces

LIEUTENANT COLONEL MILTON E. GODFREY, *Air Corps*
Office of the Assistant Chief of Air Staff, Personnel, Headquarters AAF.

"THE best qualified men for overseas duty" has become a slogan in the Army Air Forces.

In the summer of 1940 the Army Air Forces were faced with an expansion program which has been subjected to constant revision upwards until it has finally resulted in an increase from the 50,000 officers and enlisted men at that time to the over 2,000,000 officers and enlisted men of the present Army Air Forces. This expansion did not mean the simple adding of over 2,000,000 bodies to the Army Air Forces, but meant that these bodies must be in the form of trained specialists.

To obtain sufficient numbers of the high type of individual needed to absorb this specialist training quickly, certain concessions were granted the Army Air Forces:

1. Publicity designed to create the urge to fly in young men was authorized to assist in the procurement of pilots, navigators, and bombardiers.
2. Authority for commissioning direct from civil life certain individuals possessing required skills was granted.
3. The Army Air Forces was allowed to draw heavily from the ranks of Reserve Officers who had received administrative training in the Civilian Conservation Corps.
4. Direct enlistment of certain trade specialists from civil life was authorized.
5. Seventy-five percent of selectees assigned to the Army Air Forces had to have an Army General Classification Test score of 100 or better.

The individuals received in the Army Air Forces were given a period of training averaging approximately four months in Technical, Flying, Officer Training, or other schools which were established. Personnel graduating from these schools possessed the basic knowledge required in their specialty, but weeks and months of on-the-job training

was necessary before they could perform their duties with the minimum of supervision.

The ultimate purpose of this intense planning, selection, and training program, with its attendant tremendous expenditure of funds, was to place on the Army Air Forces fighting front the finest specialists and technicians in the world.

To protect the country's investment in their branch of the Service, Headquarters Army Air Forces instigated a program to insure that Army Air Forces units and casualties selected for service in the overseas theaters represent a cross section of the excellent type of personnel comprising that fighting force. A program for inspection of units prior to their departure for ports of embarkation by representatives of the Air Inspector, known as POM Inspectors, was inaugurated. Strict inspection of casualties in AAF Overseas Replacement Depots by representatives of the Air Inspector's Office was also started, and at the time of the conference of the A-1's of all continental Air Forces and Commands, which was held at Headquarters Army Air Forces in the early part of September 1943, a committee was appointed to study the subject with the view of giving it necessary publicity in all Army Air Forces units in the continental United States as well as to develop additional procedures to insure that high type and well trained individuals were selected initially for duty overseas. The following recommendations of this committee were accepted and made immediately applicable by the Headquarters Army Air Forces:

1. That the commanding officer of the Army Air Base be made personally responsible for the selection of all personnel who were chosen for overseas duty from any unit stationed on his base.

2. That no personnel, either in units or as individuals, be shipped to overseas replacement depots or ports of embarkation unless a

certification, signed by a medical officer acting as a representative of the Base Surgeon, appears on the Soldier's Qualification Card in the case of enlisted men, or the Officer's Qualification Card in the case of officers, to the effect that the individual is physically qualified under current regulations for overseas duty.

3. That no individuals, either as parts of units or as casualls, be shipped to overseas replacement depots or ports of embarkation unless a certification, signed by a classification officer, appears on the Soldier's Qualification Card in the case of enlisted men, or the Officer's Qualification Card in the case of officers, to the effect that the individual concerned is qualified in the MOS in which he is classified.

4. That base or unit commanders selecting personnel for overseas shipment select only such personnel as have had at least thirty days prior service in their MOS.

5. That individuals selected for overseas service be of the highest experience level possible consistent with the over-all experience level of the personnel in the unit from which selected.

6. That in the selection of groups of individuals for overseas shipment full cognizance be taken of an equitable distribution of intelligence levels as determined by AGCT scores so that such groups will be balanced in Army Grades I, II, III, IV, and V in accordance with the general level of intelligence available.

7. That constant reiteration, by every means available, of the fact that the primary mission of all continental Air Forces and Commands is to provide fully qualified personnel for duty in combat areas be made to the commanding officers of all echelons in the continental United States.

As a result of the adoption of this program, a noticeable improvement in the caliber of units and individuals shipped to overseas theaters in the next few months was apparent. However, at the semi-annual conference of the A-1's of all continental Air

Forces and Commands held at Headquarters Army Air Forces in the early part of February 1944, a committee was again appointed to study this subject and submit any further recommendations deemed necessary to improve the program further. Recommendations of this committee subsequently adopted and put into effect were as follows:

1. That the Headquarters Army Air Forces, whenever possible, include lists of acceptable substitute specialists in orders to commanding officers of continental installations for overseas shipments, in order to enable the officer making such selection to select the next best man if he does not have the specialists called for in the numbers required.

2. That a fair and equitable program designed to reduce in grade enlisted men holding grades above that called for in Tables of Organization or Manning Tables, for the specialty in which qualified, be prosecuted throughout the Army Air Forces so as to make these enlisted men acceptable for assignment overseas.

3. That AAF Overseas Replacement Depots immediately issue orders returning individuals to the unit from which selected in all cases where such individuals are found to be disqualified for overseas service, either medically or professionally, when received at the depot, and that the depot in all such cases render a report to the Commanding General of the Air Force or Command having jurisdiction over the unit which selected the individual, setting forth the circumstances of the case for appropriate action. A recommendation that similar reports be furnished when individuals with defective records were received was also included.

4. That final acceptance of an officer selected for overseas service in the lower echelon be made by the Air Force or Command only after his qualifications, as set forth on the copy of his AAF Officer's Qualification Record, WD AGO Form 66-2 or 66-3, on file at the headquarters of the Air Force or Command, have been carefully checked.

The adoption of these recommendations, coupled with those formerly incorporated in the program, has resulted in most cases in obtaining the best qualified individuals for shipment to the combat areas. However, on 1 June 1944 another step to increase further the efficiency in the selection and placement of personnel in the Army Air Forces, both overseas and in the continental United States, was taken. This was the activation on that date of the AAF Personnel Distribution Command, under the command of a gen-

eral officer who is responsible to the Commanding General, Army Air Forces. The AC/AS, Personnel, is the staff officer having primary interest in the functioning of the new Command. The mission of the Command is to supervise and operate the AAF Overseas Replacement System and attendant Overseas Replacement Depots, the AAF Redistribution System and attendant Redistribution Stations, the AAF Officers Replacement Pool, AAF Rest Camps, and AAF Convalescent Centers.

Jet-Propelled Aircraft

From an article by Marshal of the RAF Sir E. Ellington, in *The Army Quarterly* (Great Britain) April 1944.

THE announcement that a British jet-propelled aircraft has been flying has aroused considerable interest, though it is unlikely that this type of propulsion will be used in the air war for a considerable time. Jet propulsion is no new idea—a rocket is jet-propelled—and the problem is to design a power unit which will produce the necessary stream of air as gas to drive the aircraft at the required speed. What are the advantages? First, it will eliminate the airscrew with its weight, complications, and risk of failure. With its elimination will go the need for an undercarriage high enough for the airscrew to clear the ground with the consequent saving in weight. The view to the front will be improved, and the installation of armament to fire ahead will be simpler. Safety will be increased because with the jet at the rear of the fuselage and no airscrew the flow over the control surfaces will be the same whether the engine is running or not. There will no longer be the need to install the engine in the nose of the fuselage or in nacelles, which should reduce head resistance, and the machinery will be contained in the fuselage where it should be accessible during flight. In time, big jet-propelled aircraft will be

made with a number of power units so that safety will be increased since a failure of one unit will not require a landing. It seems likely that high-octane fuel will no longer be necessary, and heavy oil should be usable with reduced risk of fire. With the essential and vulnerable parts of the airplane contained in the fuselage, the problem of armoring a military airplane will be simplified. It will not be necessary to install engines high in a seaplane so that the airscrews clear the spray. It is generally believed that higher speeds than with the ordinary engine and airscrew should be possible. One of the drawbacks is believed to be a high fuel consumption per hour. Doubtless with time improvements will come, and there seems no reason why jet-propelled aircraft should not have as long a range as the normal type. With its lessened head resistance and light undercarriage it should have a better useful load available for increasing the quantity of fuel carried. Since the pressure of the gasses ejected has to be raised both by compression and by heating, the jet is likely to be in the nature of a flaming exhaust. If this is so, the aircraft will be conspicuous at night and may be of little use for night bombing or fighting.

Base Section Engineers Keep Lines of Communication Open

From official report of Engineer activities, Eastern Base Section, North Africa.

THE Bridge at Djebel Abiod.—"When the Germans shelled the steel bridge at Djebel Abiod and left it hanging by a few strands of shattered girder, they knocked out an important link in the West-East supply line of the II Corps. Over this bridge ran the standard-gauge railway from Tabarka to Mateur, carrying ammunition, rations, and petroleum to the embattled American troops in the northern sector of the Tunisian front.

"A platoon of General Service Engineers, 'armed' with two mobile air compressors, a D-7 and an R-4 bulldozer, an electric welding machine, and six dump trucks, threw up a 50-foot pillar support of earth and rock held in by a cribbing of several thousand railroad ties collected from the surrounding area; strengthened, welded, or replaced the broken bridge members; and had the job complete enough at the end of seven days to carry traffic. Repair materials were hauled on the railroad track from a dump to the bridge site by a 2½-ton truck converted into a rail wagon by outfitting it with four train wheels from which the centers had been cut and which were then welded to the truck rims.

"The only delay encountered was caused by a persistent German pilot who bombed the track to the bridge on five separate occasions, cratering the roadbed each time and preventing actual work on the bridge itself for the entire second day of the job."

The Mateur-Bizerte Road.—"The thousands of machines of war that had rolled over the main arteries of travel during the African campaign had left their mark on those roads, paved and dirt alike. And now, with huge forces to be launched in new attacks on the other far shores, the machines rolled again, this time carrying men, equipment, and supplies to the ports, and threatening literally to chew the roads to pieces. Saving these life lines was the business of the Engineer Construction Section. The hard-surfaced road from Mateur to Ferryville and Bizerte

was receiving a particularly hard pounding which had reduced the width of the original asphalt to as little as ten feet in many places. It was decided to bring the road to the required two-way width of twenty feet by adding a strip of pavement to one side only, in order to allow a regulated flow of traffic to continue while the work was going on. To shut off traffic completely would have been impossible for tactical reasons.

"The side being repaired was blocked off by empty oil drums, stood on end at spaced intervals. Now and then one was filled with gravel to discourage careless drivers. Enough of these drums were available to block off several miles of road at one time.

"The cut for the additional base required was made by first scarifying to the desired depth and width, and then removing the excess soil with patrolling road graders having their blades set at the correct angle to cut the necessary width. Graders were also used for ditching.

"Crushed rock was supplied by mobile rock crushers put into operation at French quarries, from where it was then hauled to stock piles along the road. Material for the actual wearing surface was prepared in cement mixers at central points and hauled ready-mixed to the job at an appreciable reduction in man hours.

"To facilitate the road program in general, cement mixers, rollers, tow graders, and other heavy equipment were requisitioned from the French and placed in a common pool with U. S. machinery. This equipment was under centralized control which kept in constant touch with the various projects and dispatched it as needed by the project engineers.

"Such reconstruction work was extended to other principal lines of communication, not only restoring safe two-way military traffic, but preventing the original pavement from becoming totally destroyed and requiring construction of completely new roads."

MILITARY NOTES

AROUND THE WORLD

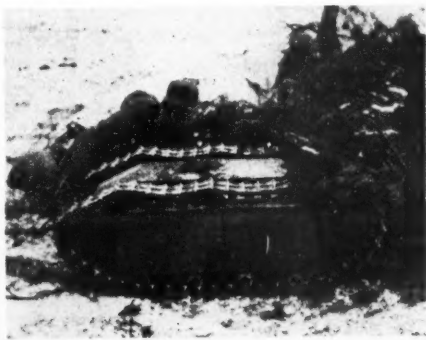
GERMANY

"Goliath"—Germany's Miniature Tank:

The first illustration below shows the special cart on which the German miniature tank, called the "Goliath," is brought to the advance position from which it is directed against enemy objectives. The second picture shows the "Goliath" camouflaged and in wait for a victim, perhaps a hostile tank or a self-propelled gun. Its control apparatus is now set for action.

Allied accounts of this so-called "secret weapon" differ considerably from those ap-

peared. It is five feet nine inches long, of spot-welded construction, and it seems to have



proved little more than an expensive military toy.

(From German and British sources.
Pictures from *Berliner Illustrierte Zeitung*)



pearing in German sources. Actually a remote-controlled mobile land-mine, the "Goliath" proved a fiasco in Italy. A British account describes it as controlled, not by radio as at first reported, but by 1800 feet of cable wound on a drum. It cannot reverse, its armor is light, and its speed low. If it contacts, it destroys itself. Manipulated by an operator crouching over a switch box at a distance, the "Goliath" was used in attempts to blow breaches in Allied wire or to explode mine-

"Asymmetrical Plane, Bv 141":

The German Luftwaffe has released pictures, via Sweden, of a new craft described as an "asymmetrical plane, Bv 141." A single engine affair, the propulsion machinery is mounted in a thin, cigar-shaped fuselage, slightly off-center. There is only one tail elevator, on the left side, which also is the off-center side. The cockpit is said to balance the fuselage and is about the same size as the normal engine mount on a two-motor bomber. Special advantages supposed to result from this departure in design are not given.

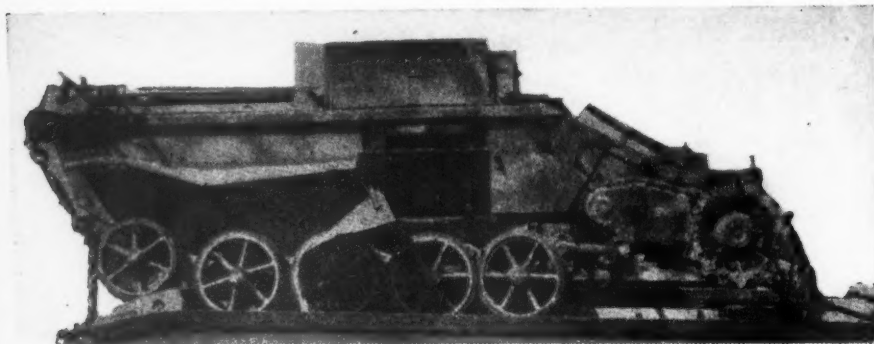
(*The Marine Corps Gazette*)

The German Winged Bomb:

The drawing shows certain details of the German radio-controlled glider bomb (not to be confused with the "robot" flying bomb). The explosive head conforms to the ordinary

shape of the standard German bomb, but the after-body carries electrical receiving gear and relays for controlling its flight, an aerial, and the tail. The wings are of short span, with a wide chord, and are provided with ailerons. The bomb is usually carried beneath the fuselage of the parent controlling aircraft, and after release is directed to the target by radio. The winged bomb is provided with rocket propulsion, the rocket being carried in a separate case slung beneath the bomb, the propulsion force being directed rearward and slightly downward from the casing.

*(The Illustrated
London News)*

*Radio-Controlled "Tank":*

The German radio-controlled "tank" shown in the picture was used for the first time against the Fifth Army at Anzio. It was salvaged under heavy fire by a British REME (Royal Electrical and Mechanical Engineers) team. The vehicle is twelve feet long, six feet wide, and four feet high, and is described as an explosives carrier rather than a tank. It has dual controls for the driver who takes it as far as he dares, and radio-controlled equipment which can be operated from a transmitting set when the driver dismounts.

The radio controls are intended to guide the "tank" to its objective where, put into reverse, the machine drops its 800-pound explosive charge and returns to the driver, who remounts and drives it back to his own area where he receives an iron cross, second class. The machine has armor of only three-quarters of an inch at the thickest part. The driver has to expose his head and shoulders to see, as there are no vision slits. The vehicle is petrol driven and is believed to be capable of twenty-eight miles per hour on a good surface.

(The Times, London)

Schmeisser Submachine Gun, MP 40:

The Schmeisser submachine gun MP 40, a light, compact weapon, has become the standard submachine gun of the front-line fighting units of the German Army. Its operation is based on the blow-back principle. In this type of action the opening of the breech is delayed until the bullet leaves the muzzle and pressure has dropped to a safe degree. The sighting equipment is of the simple open



type. The front sight is the usual German inverted "V" mounted on a ramp with a spring-steel cover, and the rear sight is a combination fixed- and folding-leaf type. A folding stock, similar to that on our M3 submachine gun, is used which enables the weapon to be fired from the hand or shoulder.

The caliber of the MP 40 is 9 mm (.354). It takes the standard 9-mm Parabellum cartridge used in such guns as the British Sten, Australian Austen, and Italian Beretta. The 9-mm pistol ammunition made for the Luger, Walther P-38, Glisenti pistol, and others will also function in this weapon; however, the use of Schmeisser ammunition in pistols chambered for the 9-mm cartridge is a dangerous practice as the chamber pressures run higher than those intended for such guns. The length of the complete cartridge is 1.009 inches. The range and penetration of this cartridge are superior to that of the caliber .45 ACP, but its shocking power is not as great. The magazine (not shown in the photograph above) is a stamped fabrication and is of the staggered box type. The magazine capacity is thirty-two rounds; however, the weapon will operate much more smoothly if only twenty-five cartridges are loaded.

Though there is no provision for semiautomatic fire, it is possible to fire one or two shots by quickly squeezing and releasing the

trigger, but the gun is not as accurate as it would be if it had this adjustment.

The Russians like this gun and are known to be using it in large numbers.

(Army Ordnance)

The 45-ton "Panther" Tank:

A 45-ton tank called the "Panther," mounting an exceptionally long 7.5-cm high-velocity gun, is Hitler's latest production in armored fighting vehicles. The Panther is manned by a crew of five. Probably the most striking feature of this new tank, apart from the gun, is its very long, sloping front plate which closely resembles that of the famous Russian cruiser tank, T-34, and indeed it would appear that, to a certain extent, the design of



the Panther's hull has been copied from the Russian tank, which the Germans are known to have held in high esteem. In addition, the tracks are of a new pattern and as with the hull design show traces of Russian influence.

Although about the same size as the Tiger—it is actually about two feet longer—and embodying many similar mechanical features, the Panther is designed for an entirely different role—that of a cruiser tank with a fair turn of speed, and a good all-around performance.

The main armament consists of a new 7.5-cm (2.95-inch) gun with an overall length of about eighteen feet. The gun's armor-piercing performance is in the same class as that of the 8.8-cm gun mounted in the heavy Tiger tank. Alongside the 7.5-cm gun in the turret is one 7.92-mm mechanical gun, but there is no machine gun in the front of the

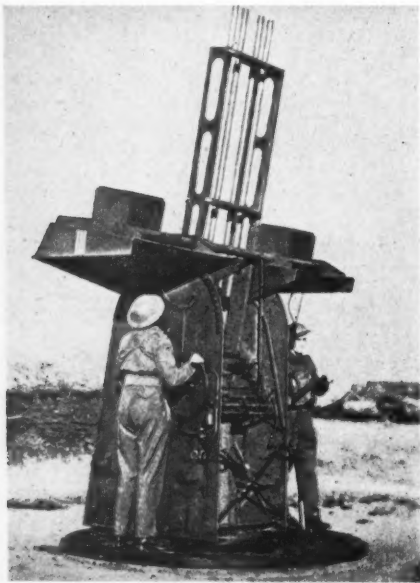
hull as has hitherto been the custom in German tanks.

Thickest armor measures four inches and is found on the gun mantlet, but the many sloping plates on the tank should provide a good degree of immunity from attack and incidentally give the tank a rather streamlined appearance. The sides are only about one and three-quarters inches thick. This is not much for a 45-ton tank and may prove to be Achilles' heel of this new heavyweight cruiser.

(*The Tank*, Great Britain. Picture from *The Illustrated London News*)

GREAT BRITAIN

Antiaircraft Rocket Guns:



Antiaircraft rocket guns have been used in defense against enemy night raiders since 1941. In its original form the rocket weapon was designed for defense against the low-flying dive-bomber, but after trials it was

found to be very effective against high-flying night bombers, and since 1941 rockets have been made in enormous quantities, and a large number of batteries have been formed, most of which are now manned by the Home Guard. The rocket propellant—one of the most effective yet known to the Allies—has been developed in Britain and turned over to United States Army Ordnance by the British authorities, and is now in production in the Middle West as well as in Britain.

(*The Illustrated London News*)

The "Rafwaffe":

The queerest squadron in the RAF consists of a group of crack pilots who fly genuine Nazi aircraft, all of which have been captured practically intact from the enemy. This "Rafwaffe" possesses most of the types produced in Germany today. When they acquire a new plane it is sent to a special station for overhaul, and is then flown by British pilots. These men are thus able to give the Air Ministry a constant flow of information concerning capabilities and performance. They also tour RAF stations and demonstrate to the various pilots the enemy's methods of attack, thus cooperating in the final stages of a British pilot's training.

(*The Sphere*, Great Britain)

Invasion Map:

While it is true that Royal Air Force reconnaissance planes have made the biggest contributions of data for the invasion map showing details of the coasts of Europe, they were not the only contributors. In addition, hundreds of British holiday-makers, who took their cameras with them on prewar holidays, have turned in their snapshots. Bit by bit an extraordinarily detailed picture of the coast has been fitted together. The enemy's anti-aircraft positions have of course been revealed by their opening fire on Allied aircraft. Coastal defenses have been discovered when they opened fire on the light coastal craft and destroyers. All new photographs are scrutinized intensely under the stereoscope to discover changes in camouflage and

positions of German defenses, all of which are duly noted on the map. The Germans have themselves witnessed the gathering of much of the data, when RAF reconnaissance planes have flown over, and have been most painfully aware of commando raids picking up information and prisoners. Perhaps some other data has been gathered without their knowing it—by continental patriots who have escaped across the Channel or the North Sea, not to mention some other workers whose activities are the best-kept secrets of the war.

(From a British source)

"Human Torpedoes":

The British Admiralty has released some details concerning the "human torpedoes,"

proaches its target silently and at a speed which is presumed to be quite low, then dives below the surface. Once under water, the crew detach the explosive charge mounted in the nose and fix it to the bottom of the enemy ship. Time fuzes are set, and the crew drive the craft away before the charge detonates.

The crewmen are dressed in several layers of thick woolen clothing, over which they wear a forty-pound diving suit with a visor. Each man carries an oxygen tube in his mouth and small oxygen bottles strapped on his back. The clothes are scientifically designed so that the normal blood circulation is maintained even under water.

The men who ride the torpedoes are all



one of which is shown in the picture above. Their color is green, and they are twenty-one feet long. The crew consists of two men, whose action stations are astride the torpedo. The man in front steers the craft with a rubber-handled "joy-stick," below which there is a dashboard of luminous dials. The weight of explosive carried is equal to that of an ordinary torpedo. There is a clock-work device which times the charge to explode after the crew have got away.

Driven by electric batteries, the craft ap-

proaches its target silently and at a speed which is presumed to be quite low, then dives below the surface. Once under water, the crew detach the explosive charge mounted in the nose and fix it to the bottom of the enemy ship. Time fuzes are set, and the crew drive the craft away before the charge detonates.

(From various British sources.
Picture from *The Illustrated London News*.)

CANADA

Rescue Work in Oily Seas:

Many Canadian destroyers and corvettes are now equipped with new rescue equipment which scoops exhausted, oil-covered survivors from the sea. A net is operated by a line from a boom which extends about eight feet from the side of the ship. Survivors are scooped up singly head and shoulders first. The operation can be carried out by one rating, and experiments with man-size dummies resulted in four dummies being scooped up in three and one-eighth minutes.

(*The Times*, London)

NEW ZEALAND

New Zealand's War Effort:

The population of New Zealand at the outbreak of war was 1,630,000, and the number of men between the ages of eighteen and forty-five was 355,000. Of these, 157,000 were serving full time with the armed forces at the peak of mobilization. Approximately one man of every three of military age in New Zealand, regardless of his family obligations or the number of his children or his occupation, has seen overseas service. Casualties have been extremely high, and with the probable exception of Russia they are, in proportion to population, the highest among the United Nations.

(*Times Weekly Edition*, London)

RUMANIA

The IAR 80:

The single-seater pursuit plane, IAR 80, which has been manufactured since 1939 by series production methods and even at that time possessed a maximum speed of about 520 kilometers per hour, now has a range of from 900 to 1,000 kilometers and, as a result of its great success on the eastern front, has been designated as "the masterpiece of the young Rumanian aircraft industry."

(*Artilleristische Rundschau*)

UNITED STATES

The M-5 Tank:

The function of the M-5 light cruiser is to operate in advance of the main forces, and for that purpose it has high speed, maneuverability, and a remarkably silent mechanism so that the enemy will not quickly become aware of its approach. Everything about the tank is easy to operate. It will be noted that the deck is free from extraneous impedimenta. Access to the turret is gained by removing triangular sections. The driver has a hatch in the deck on the left-hand side of



the gun and can drive with his head through this if the coast is clear. The 37-mm quick-firing gun is designed for hit-and-run work, and a .30-caliber machine gun can be fitted. These tanks have already been used successfully in Italy and in the South Seas.

(*The Sphere*, Great Britain)

New United States Artillery Piece:

Successful tests on a new long-range mobile artillery piece, designed to outfire the German 170-mm, were announced by the Army at its Aberdeen, Maryland, proving ground. The new American weapon is an 8-inch (200-mm) piece and will fire a projectile nearly twice as heavy as that of the Nazi 170, throwing it two miles farther than the enemy gun.

(*The Marine Corps Gazette*)

FOREIGN MILITARY DIGESTS

Tempo of Offensive Operations

Translated at the Command and General Staff School from a Russian article by
Major B. Corol and Major I. Agibalov, Soviet Army, in *Krasnaya
Zvezda* (Red Star) 6 February 1944.

AMONG the principles which determine the essence of modern offensive there is one which may be considered all-important. It is the tempo of operation. For it is the tempo that guides the military commander on the field of battle, and it is the tempo that contains the explanation of the complex mechanism of battles in the present war—the most fluid war in the history of mankind.

With the appearance of tanks, mechanized troops, and aircraft, which have given birth to new forms of warfare, the idea of high tempos of offensive operations has freed us from the jaws of positional warfare and produced hitherto unparalleled development. Upon these tempos depends now literally everything; and each battle, in effect, is a struggle for tempos, i.e., for time, space, and initiative.

The tempo may be considered as a criterion for judging the development of an offensive operation, its strength, and its possibilities. An offensive which develops normally and with all the force it should possess is characterized first of all by high tempos in its principal phases. Such was the case with the advance of the army of General Vatutin when, after having pierced the German defense on a front extending over 300 kilometers, it fanned out, as if in one mighty wave, towards Novograd Volynskii, Kazatin, Berdichev, and later toward Rovno and Lutsk.

The high tempo of an offensive is, not infrequently, identified with the speed of operation.

The two ideas, however, although related to each other, are not identical. Even the speed of advance is not the tempo of advance, for both—speed and advance—are only factors which determine the tempo of an operation. Speed, by the way, depends largely on the moral qualities of the army, such as the determination and courage of its troops in exploiting the results of artillery and aircraft preparation in the course of an attack. That is why our regulations stress most emphatically the tremendous importance for the outcome of an offensive battle of the inflexible determination of the troops to move ahead. Thus, even moral factors are connected with the basic law of the modern battle—the law of high tempos. A daring and intelligent plan, a skilfully conceived combination of forces and means of the main and secondary attacks, of maneuver and fire—all contain the idea of high tempos and are united by this idea. And only the skilful execution of the plan can utilize all the factors which determine the high tempo of the offensive. These factors are quite numerous. The ability to create them and making use of them is the touchstone of military art. High tempo requires a maximum possible continuity of advance. In the course of an offensive there are pauses which, according to a statement of Clausewitz, are like heavy weights on the legs of the advancing army. These pauses are inevitable. But it is also true that the fewer are these pauses, the

higher are the tempos of the offensive operation. But during certain decisive phases there should be no pauses at all, and this must be the goal of every experienced commander, for very often the success of the operation depends entirely on whether or not the troops succeed in avoiding such pauses during the decisive phases of the battle.

The use, by the defenders, of tanks, mobile artillery, and armored transports with infantry often causes special pauses which are typical of modern warfare. Perhaps these pauses delay the tempos of the offensive to a grèater extent than do the defensive pauses, which occur when the maneuver of the attacking troops is broken up by maneuvering mobile groups of the defense. The offensive has not stopped. It continues, but the signs of a defensive pause are becoming apparent. Such a pause is often unavoidable because the attacking side may be weakened as a result either of an obvious lack of forces, or, even worse, of a number of errors which lead to an unnecessary dispersion of troops. This is one of the most important phenomena, and it requires a planning of the offensive operation based on a detailed consideration of all the capabilities of the defense and on a thorough knowledge of the nature of modern weapons. Without this (unless the planning is based on an overwhelming superiority of forces) it is difficult to attain the maximum possible continuity of advance.

Each type of troops should be given a mission which would enable it to use its specific strength to the greatest extent. It is also important to take advantage of favorable situations developing as a result of errors on the part of the enemy in order to make the best use of one or another type of troops. Cooperation may be considered as correctly organized only when one unit not merely coordinates its action with another unit but also is relieved by it at the right time and in the right place. The latter is often more important than coordination, for the basis of a modern offensive operation is the maneuver of mobile troops, which is usually accomplished in the midst of hostile counteraction

on the part of enemy tanks, motorized infantry, and aircraft.

The cooperation of various types of troops and, of course, of the adjacent units should contribute to the breakthrough and to the quick completion of the maneuver in spite of the attempts of the enemy to produce a pause in the advance, no matter what degree of maneuverability his troops possess. If there is no such cooperation which would secure the impetuosity and uninterruptedness of the conceived maneuver, the tempo of the advance is doomed to slacken.

When troops effect a breakthrough, their operations are centered on definite and concrete objectives. It is after the breakthrough that they may easily lose the awareness of their main purpose. The troops find themselves amidst wide spaces from every point of which the enemy may strike. Flanks are uncovered, and not infrequently the rear of the units remains unprotected. A special need for reinforcements arises. It seems that they are needed everywhere. This stage, which is the most favorable for the achievement of success inasmuch as the tactical zone of the defense is already pierced, is at the same time the most dangerous for the fate of the operation, for it is in this phase that there exists a tendency for an unnecessary dispersion of effort, especially if there were miscalculations in the plan of the offensive and the commander and his staff failed to correct them in due time. On the other hand, a correctly conceived plan of the operation and its careful preparation, especially if it provides for the element of surprise in the initial attack, enable the commander to avoid the danger of dispersion of forces and, consequently, to reduce the number of pauses.

The operation which resulted in the capture of Kirovograd and the encirclement of the German group in that area is very characteristic in this regard. The whole operation, from its beginning to its very end, was conducted in high tempos, which enabled the commander to prevent the enemy from bringing reinforcements in time and to encircle and defeat him before their arrival.

The troops of General Konev attacked in

two directions—north and south of Kirovograd. In the morning of 5 January, the infantry and its supporting tanks, which were backed by artillery and aircraft, started the attack. The mobile groups for the development of the breakthrough were waiting in the rear. Not one of these groups was used for breaching the forward edge. The breakthrough of the entire tactical zone of defense was accomplished by the forces specified in the plan of the operation. Thus, the bulk of the tanks was saved for its main purpose—the maneuver in the depth. This fact may be considered as an important condition of a correctly organized cooperation which creates the prerequisite for the high tempos of the operation.

By the end of 5 January, the entire tactical zone of the defense on the right wing of the army had been passed, and the mobile group, having advanced from thirty to thirty-five kilometers, reached the area north of Kirovograd. The advance on the left wing progressed more slowly at first. However, one could already clearly notice a two-sided wedging-in, which broke the German defenses on a front of more than 100 kilometers. Seven German divisions began to roll back. Out of these, three tank divisions and one motorized division which composed the mobile core of this grouping were not used during the first phase of the battle for parrying the main blow, as it was impossible to guess where it would fall. But even in this phase the enemy used his basic method of defensive operations. He counterattacked with comparatively small groups of tanks and motorized infantry supported by bomber planes. Besides, he counterattacked often and in numerous directions, fanning out to the northeast, east, and southwest of Kirovograd.

A battalion of infantry and from ten to fifteen tanks do not represent a great force. But when such groups are numerous and are backed by a previously prepared network of strongpoints, the danger of dispersion of the attacking forces is quite real. This danger became perceptible on the left wing where signs of lingering battles appeared, i.e., of that peculiar pause which was described

above. The planned maneuver of the tank troops could have been stopped here. But this did not happen, due to the exceptional consistency in the development of the maneuver by the right wing. There the mobile group advanced rapidly to the assigned place and so far into the depth that the German command deemed it necessary to throw against it its powerful tank forces. Having hastily regrouped his tank troops, the enemy threw them against the flank of our mobile group, attempting to cut off the wedge which was threatening his basic communications. Judging by this maneuver of the enemy, it was obvious that he believed our right wing to be the concentration of our main forces. This error on the part of the enemy was utilized with great shrewdness by the tank units of General Rotmistrov, which operated on the left wing as a part of the main forces of our advancing group. Since the Germans had diverted the bulk of their tanks for parrying the attack of the right wing, General Rotmistrov eluded tank battles, which enabled him to use his forces for the further development of the attack. His tank units turned to the southern outskirts of Kirovograd and appeared west of the city. But even before that, the right wing had enveloped the city from the northwest.

As it was pointed out above, a powerful German tank group, which consisted of hundreds of vehicles, was thrown against the right wing of our troops. Had the enemy succeeded, by this maneuver, in forcing our tanks to engage with his tanks, there would no doubt have occurred a pause which might have disrupted the plan of the encirclement. But the main purpose here, on the right wing, was to avoid a tank engagement at all costs and thereby allow the mobile group to accomplish its maneuver in the previous high tempo. The essence of the foresight which was displayed in this operation was the fact that all the forces which were to relieve the tanks were at the right place from which they could rapidly be concentrated for the localization of the enemy counterblow. Against the German tank troops there was

established an artillery-infantry shield which protected our mobile troops.

The Germans, in attempting to delay our mobile groups, were forced to fight under the most unfavorable conditions. Enemy tanks found themselves under direct fire from all types of guns, including heavy ones, which were with the combat formations of the infantry. The fact that even the heavy guns conducted direct fire indicates the skill with which the artillery regroupment was carried out. Everything was in movement, the enemy counterattacked everywhere, and defended himself fiercely on each fairly defensible terrain line. Under such conditions it is particularly important not to lose sight of the principal mission. It was precisely this that helped determine correctly the moment for the regroupment of the artillery and infantry. That is why the plan of cooperation was carried out to the end, which prevented the enemy from engaging our right wing in a tank battle. This allowed our mobile group to execute another encirclement near Kirovograd, i.e., to come out, not only to the north of it, but also to the west, thus severing the enemy's routes of retreat.

Thus, the encirclement was completed with two meeting claws. This had been accomplished by the evening of 6 January. Consequently, a breakthrough to a depth of fifty kilometers was carried out in two days and a powerful enemy concentration found itself in pincers. Its final rout followed. Such were the high tempos of this operation, determined in its very conception.

From the brief description of certain aspects of this operation it is apparent that aside from the speed of action, speed of advance, and the maximum possible continuity of operation, the very character of cooperation and of maneuver affects the tempos of the operation.

It is difficult to give preference to any one of the factors determining the high tempos of an operation. It should be emphasized, however, that the speed of the advance depends on the reserves. The use of reserves is one of the most difficult fields of military art. The very tendency toward maximum

tempos is brought about, first of all, by the necessity of preventing the enemy's reserves from interfering with our attack. The organizer of the operation should foresee when and where he can best make use of his reserves for that purpose.

It may also happen that, in spite of the correct selection of the direction of the main attack and of the skilful cooperation and control, the tempo of the maneuver begins to slow down as a result of the counterattacks of the enemy who has been able to concentrate rapidly the necessary forces. The use of the reserves in this case may not have been foreseen by the plan of the operation. However, for the sake of maintaining the high tempo of operation, it is very important that the commander quickly realize the necessity of such a step and commit his reserves boldly and with determination, possibly in an entirely new direction, in order that the maneuver of the main forces may be carried out.

A timely and correct use of the reserves makes it possible not only to complete an operation that has already begun but also to build the foundations for high tempos in the next operation.

In the battle of Poltava, for example, the enemy's main forces were considerably softened up on both flanks of his defense. The commander considered this moment as the most suitable for committing the reserves. The artillery, tanks, and motorized infantry increased their pressure on both flanks, and by doing so the attackers avoided here that state of equilibrium which develops when the enemy manages to counterattack by drawing in his tanks from the rear or by regrouping them along the front. Creating fire screens by using the artillery reserves and disposing them to meet probable enemy tank counterattacks, the command had contributed to the further bold advance of our mobile groups. These groups reached the Dnieper before the Germans had a chance to organize bridgehead defenses. Thus the Poltava operation was successfully concluded, and our troops rapidly crossed the Dnieper and organized a bridgehead on the opposite bank.

This example demonstrates how the high tempo of one operation contributes to the success of another operation which is a continuation of the first operation. Thus, the sequence of blows in the depth depends on the tempo of advance. But there is also an inverse relationship, which is more characteristic. The experience gained during the course of our offensive also shows that the sequence of operations determines the high tempo of the advance. This sequence of operations, in effect, is directed against the hostile reserves. Because of the breakthrough in one sector, enemy reserves are diverted from another sector on which the offensive then develops at a high tempo. Let us recall, for instance, with what speed the Germans were swept out from the Don basin. It is well known that this was the result of successive operations on a wide front.

It was indicated above how easily the main

purpose of the operation can be lost when the tactical zone of defense is passed. In connection with this a question arises: where and at what distance from the main forces should the reserves be located? Naturally, it is difficult to give a definite answer. The reserves may be located where the activity of the attacking units is most intense, or they have to be kept in the sectors where there is a growing danger of flanking counterblows by the enemy and of his appearance in the rear of the attackers. Everywhere, however, the principal mission of the reserves consists in helping to maintain the tempo of advance of the main forces.

The combat operations of the Red Army demonstrate that the most important factor of a modern offensive operation is its tempo. The efforts of all arms should, therefore, be directed toward securing a high tempo of offensive operations.

Japanese Air Force

From an article in *The Aeroplane* (Great Britain) 7 April 1944.

THE Japanese Air Force is not built up of aircraft merely copied from those of other Western Powers. Admittedly their designs owe much to the West, but the Japanese have also used brains and imagination. Japanese pilots are brave and skilful, but certainly are not all members of the Suicide Club. Their staff work is carefully worked out in detail like that of the Germans, but, also like the Hun, they miss the wood for the trees.

The mainstay of the Japanese Bomber Force is a development of the Mitsubishi Army 97 medium bomber, a mid-wing all-metal monoplane. It has a span of seventy-three feet nine inches, a normal all-up weight of 21,500 pounds, carries a crew of seven, and is fitted with two 1,050-horsepower 14-cylinder air-cooled Mitsubishi Kinsei MK-44 motors having two speed superchargers. The armament consists of a 7.7-mm machine gun in the nose, one on each side, one underneath, and one in the tail, supplemented by a hand-

operated dorsal position mounting one 12.7-mm machine gun. Very little, if any, armor-plating is fitted although the pilot's seat is normally armored and the crew has been known to wear armor vests. Its maximum bomb load is 4,400 pounds with internal stowage, and, normally, this is made up of 110-pound bombs. The maximum speed at a rated height of 13,000 feet is about 275 miles per hour. With the standard bomb load the range is 1,000 miles, but when the load is reduced the range is extended to nearly 1,400 miles.

Other types are the Kawasaki Army 99, which is a two-motor bomber, having much the same range and performance but less bomb load, and the Army 00 Dinah, which is mainly used for high-altitude and reconnaissance work, having no armor-plating and, normally, no guns or bombs. This airplane has the highest performance of all the Japanese bombers with a maximum speed of 350 miles per hour and a ceiling of 37,000 feet. It

will be realized, therefore, that the Japanese have nothing to compare with our heavy bombers, such as the Lancaster, neither have they produced any outstanding high-performance airplane such as the Mosquito.

The Japanese bombers are mainly used for day work. Night flying is not a specialty of the Japanese Air Force at present, although it may become so later on. A great deal was written about the night raid on Calcutta, when the Japanese lost three aircraft in as many minutes. Their tactics by day are simple but effective. Invariably they fly on the orders signalled from the leader of the formation, the bombs being dropped in pattern. They rarely make more than one run over the target, and the accuracy of their bombing is high. It is evident that the leading aircraft of their formations have crews of the highest caliber, while the other crews are obviously merely trained to keep formation and to defend themselves to the best of their ability. Naturally, being a medium bomber, the Mitsubishi Army 97's cannot carry a heavy load and normally use only small bombs. The results of their raids, therefore, are usually not commensurate with the effort involved and the admittedly skilful staff work which organizes them.

The Japanese Bombing Force in Burma is not overwhelmingly powerful. Rarely does one see a great concentration of bombers at one airdrome. Profiting perhaps from our own mistakes in the Burma campaign, the Japanese have learned full well the value of dispersal, and the stupidity of giving the opposing air force a profitable target to attack. Their normal policy, when they plan a raid, is to bring their bombers from many stations, spread over a wide area, in towards an area from which they start the raid. Such moves are often skilfully carried out shortly before the raid is due to start. Before the raid is planned, their aircraft are usually lying at airdromes out of range of attack by our long-range heavy bombers. Their bomber forces then go off to airdromes at which they refuel and then, from there, form up and go off to their objective. Very rarely do they operate in formations of less than fifteen,

and it is the accepted practice to have their bombing formations supported by a powerful fighter force covering them from above. The Japanese fighters are very long-range aircraft.

The mainstay of the Japanese Fighter Force is the Nakajima Army 01, which is a perfectly orthodox, rather lightly constructed fighter, with no really novel features except that the wing is built in one piece, the main spar running right through the fuselage. The Mitsubishi Navy 00-1 and 00-2 are almost identical in general outline, but have a slightly higher performance. The main feature of these fighters is the large petrol-tank capacity, which gives them a range in the case of the Army fighter of 1,350 miles, and in the case of the Navy fighter of 1,270 miles, using overload tanks. They use jetison-tank tanks shaped rather like a bomb, slung underneath the middle of the fuselage. Although lightly built and carrying very little or no armor-plating, they have quite a powerful armament, having two 20-mm guns and two of a caliber equivalent to our .303. The "01" only carries two 12.7-mm machine guns firing through the propeller.

Apart from their range and quite formidable hitting power, the Japanese fighter aircraft have very excellent maneuverability. Their performance is not outstanding, but they are not slower than the Hurricane, which for a long time has been the mainstay of the Bengal fighter force. In climbing power they are superior to the Hurricane, although their ceiling is probably lower. Thus it will be seen that the Japanese have not pulled a surprise packet out of the bag in the way of fighter development but, all the same, have produced some very good and highly maneuverable types.

The Japanese fighter pilot is popularly supposed to belong to the Suicide Club, but his tactics and methods of fighting are generally very similar to those of our own pilots. Cases have been known of both Japanese fighter and bomber pilots deliberately crashing their aircraft on to the target or into other airplanes, but such cases are very rare and experience has shown that the Japanese

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fighter pilot has quite a high regard for his own skin. Perhaps his most outstanding quality is his ability to carry out very long escort flights and yet fight efficiently after several hours in the air at a great height. This, one would expect in a nation trained from their youth to hard living.

[This article was written some months ago in the light of prevailing conditions and available information. Since then a new single-seat fighter, believed to be the Nakajima Army 03, has gone into service and made its appearance on most of the Japanese

fronts. Powered by a Japanese-built Mercedes-Benz DB 601 12-cylinder inverted-vee in-line motor, this type can be used as a fighter-bomber carrying two 500-pound bombs on racks under the wings. Another new fighter is a two-motor long-range fighter, believed to be of Kawasaki design, armed with cannon and machine guns. To the Japanese bomber force has been added the Mitsubishi Army 00 long-range bomber, which is another development of the Mitsubishi Army 97.—Ed., *The Aeroplane*.]

Battle Formations of Tanks in Breakthrough Operations

Translated and digested at the Command and General Staff School from a Russian article by Major A. Soichenkov in *Krasnaya Zvezda* (Red Star) 13 January 1944.

THE factors determining the battle formation of a tank regiment advancing to the attack are the terrain, the character of the antitank defense of the enemy, and the plan of the contemplated operation. The more varied the terrain, the more varied and diversified are the possible battle formations of the tanks in the attack. There are, however, a few general guiding principles: the commander is to insure the simultaneous participation in the battle of the greatest possible number of tanks; all tanks should deliver fire and operate in complete conformity with the terrain, and be able, at the desired moment, to shift suddenly the direction of their attack.

Armored units move forward for breaching hostile fortified zones in various formations: "V" formation, inverted "V" formation, "echeloned to the right," "echeloned to the left," and, at times, deployed in a line. Let us examine the conditions under which the various formations are used.

"V" formation is often best for attacks on a fortified zone on a narrow sector of front. On one occasion our regiment was assigned the mission of breaking through the enemy's defense on a front about 700 meters wide. The infantry was to follow the

tanks. The regiment had to attack with its flanks open, there being no adjacent units. It was subsequently obliged to protect its own flanks. On the basis of these considerations the commander deployed his units in "V" formation. In this wedge-shaped battle formation, all the track vehicles conducted fire without interfering with one another. As soon as the breakthrough was effected, the tanks which had been following on the flanks widened the breach by a sudden maneuver, and the outcome of the operation was decided.

When the tanks operate with one open flank, the battle formations "echeloned to the right" or "echeloned to the left," in accordance with whichever flank is not defended, is completely justified. Experience shows that "V" or echeloned formations of tanks, when operating together with other units on their flanks, limit the fire activity of vehicles moving in the rear. Here, therefore, a linear formation of tanks is most advantageous as far as their fires are concerned.

By linear formations is by no means meant, however, the stringing out of all engaged tanks into a line. This battle formation, like any other, possesses depth for the reason

that some of the tanks move a little in advance while others lag behind. In addition to this, tanks moving into action in an extended line, in one or two echelons, constitute simply a part of the battle formation. The commander must also provide an artillery group for tank support and detail a number of pieces as a reserve. If a formation of this kind does not possess sufficient depth, that is, if the tanks move along in a single line, their efforts will lack the element of constantly increasing power, and the enemy will quickly recover from the first blow.

The commander of an infantry unit decided to draw up all the tanks which had been attached to him in a single line in front of the infantry for an attack on a strongly fortified enemy position. The tank officers, however, recommended that the tanks be disposed in two echelons and a small portion of the machines be left in reserve, but the infantry commander absolutely forbade this. He thought that such a disposition would diminish the force of the first blow.

The tanks moved forward. Behind them advanced the infantry. The rather strong initial blow achieved a certain measure of success. The fortified German zone was broken through in several places. But when the fighting was transferred to the depth of the defense position, the pressure of the tanks and infantry slackened, and the attackers were not able to complete the assigned mission. It is true, the infantry drove the Germans from the trenches, and the tanks, for their part, wiped out several strongpoints, but further advance was checked. The Germans concentrated large groups of infantry and tanks on the flanks, and as soon as our forces penetrated the position, the tanks had to repel the counterattacks and only with difficulty retained the line they had reached.

Thus, a tank attack in which "all the eggs were placed in a single basket," so to speak, was quickly blocked. This was a result of a conventional employment of tanks without taking into account the actual battle situation. Very different results might have been obtained if the tanks had operated in the direction of main effort in two echelons, with

a part of the tanks in reserve. Such a formation would also have resulted in constantly increasing the strength of the blow and would have warded off the hostile counter-attack. It is precisely the second echelon and reserve group that play a decisive role in the development of the attack.

We must still add that the rugged battlefield, traversed by numerous ravines and gullies, would have made it quite possible for the tanks to suppress the strongpoints of the Germans by using small, maneuverable tank groups. This peculiarity of the terrain was not taken into consideration either. Thus, the linear disposition of the tanks over a distance of a few kilometers, without a reserve or a second echelon, resulted not in a strengthening but in a weakening of the tank blow.

In breakthrough operations it is important, first of all, to determine how to establish cooperation of tanks, infantry, and artillery, and only then make a decision. At other times (particularly when there is but a limited number of tanks at the disposal of the commander), it will be expedient, in place of making use of the tank unit as a breaching tool, to assign them the task, during the first phase of the action, of supporting the infantry. In this manner, both types of arms profit.

Recently, on one sector of the front, the situation assumed the following form. The enemy occupied a line of commanding and strongly fortified hills which covered the approaches to a large populated place from the north. An infantry unit was assigned the mission of making its way by night through a defile and, at daybreak, in cooperation with the artillery and aviation, of effecting a breakthrough on a narrow front (up to 500 meters). Then the unit was to break up and crush the German group operating in this area.

Having estimated the situation and having consulted with the tank commander, the commander of the unit came to the conclusion that under the circumstances it was inexpedient to send the tank regiment into the attack ahead of the infantry. This would

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lead to a large loss of machines during the first phase of the operation. Tanks, after the breaching of the forward edge, are especially needed by the infantry. It was decided, therefore, to break through the forward edge by the joint effort of the artillery, infantry, and aviation, but to use the tanks afterwards, when their maneuver in the depths of the position would be safer.

At the appointed hour, the artillery and aviation struck a powerful blow at the German fortifications and suppressed the enemy's fire system. After an hour of artillery preparation, the infantry sprang forward to the attack. The infantry advanced shoulder to shoulder, with the tanks of the first echelon deployed in a line. The tanks virtually played the role of mobile fire points. Behind them, into the breach that had been formed, rushed without delay the tanks of the second echelon carrying troops armed with automatic weapons.

Generally speaking, the battle formation of the attacking units was in strict accordance with the plan of the action. In front moved the armored battle reconnaissance. Deploying over the whole front of the breakthrough, it moved out toward the line of German fortifications in order to uncover the fire system of the enemy and determine the strength of the forward edge. At a distance from them of approximately 400 meters and maintaining visual contact with the reconnaissance force moved the tank units of the first echelon, deployed in a line. In the intervals between the tanks, maintaining shoulder contact with them, moved the attacking infantry. Part of the infantry, moreover, followed behind the tanks. Skillfully placed throughout the infantry battle formation were the antitank guns. On the flanks of the first echelon of tanks were the batteries of self-propelled guns, which composed the basis of the mobile fire group. In the course of the action, they moved by bounds from one position to another. The self-propelled guns successfully conducted the fight with the antitank weapons of the

enemy and paralyzed, with their fire, the counterattacking groups.

The tanks of the second echelon, composing the greater part of the combat vehicles, were destined for the exploitation of the success. They broke into the breach in their pre-battle formation, and then destroyed, by violent blows, a series of focal points of the German defense disposed in depth. Their operations were supported by the fire of the tank reserve which followed the second echelon within direct range.

The commander of the tank regiment was all this time directing the action of his units from the mobile command post (in the tank) in the second echelon. From this position, he personally followed the dynamics of the action, quickly reacting to all changes in the situation and maneuvering the reserve. The mission was successfully accomplished.

This example of tank formation (supporting infantry in an attack) cannot, of course, be regarded as a ready-made recipe, but it certainly possesses points of interest. Here we see the carefully planned employment of tanks in which it was more advantageous to use the main body of tanks, not for the breakthrough of the forward edge, but for the exploitation and clinching of the success achieved.

In conclusion, a few words regarding the mobile fire group—the most important link in the battle formation of attacking tanks. In the operation just described, the mobile fire group was made up of self-propelled and antitank guns. But experience has shown that it is indispensable that antitank-rifle troops also be included in the fire group. The presence of antitank rifles in the battle formation of attacking tanks considerably augments the power of the fire group.

The battle formation of tanks is one of the main factors of the plan of attack. It must be decided upon jointly by the tank and infantry commanders. The more fully it corresponds to the actual situation, the greater the effectiveness of the joint action of infantry and tanks.

Training German Officer Candidates

Translated at the Command and General Staff School from a German article by Lieutenant Colonel Wieser in *Völkischer Beobachter* 12 April 1944.

THE FÜHRER has made a reality the demand made by Scharnhorst over a hundred years ago, that every young German have the privilege of entering the officers corps. Before he becomes an officer, however, the officer candidate must pass various tests. Tests for fitness in time of peace are often questionable, but in time of war the officer candidate must pass the most serious and unconditional one, namely, the test in the face of the enemy—the test of courage in battle. If he has passed this he then reaches the first stage in his development into an officer, his appointment as aspirant officer by the commander of the field regiment. Part of the officer candidates undergo the test in the face of the enemy as group leaders, the others as platoon or assault detachment leaders.

From the front, the aspirant officers enter the cadet-captain course where the real training as officers begins for them. He who successfully passes this course is accepted by the branch-of-service schools. His fitness for being an officer is here given a second test. If he passes the test here also, he is then recommended by the commandant of the school as a lieutenant, whereupon he receives his lieutenant's commission.

To train his noncommissioned officers and men, he must be a man who knows how. Only the man who knows how is accorded recognition. Ahead of this knowing how, there exists a certain amount of knowledge. But knowing much is not tantamount to knowing how.

The officer is also a political leader, not only of his subordinates but also of all those who enter his sphere of influence. It is seldom that any one occupies so prominent a place in the eyes of the people as the officer tested at the front. His conceptions and his views possess weight. Back of them stand the direct experiences of war. His attitude is a spring from which faith, strength, and confidence pour forth constantly into the hearts

of his fellow officers and men and into those of the nation. In him burns the idea of the Führer and he clings to the Führer with all the faithfulness of a military follower.

The first and most important task in the education and training of the aspirant officer is the further development of his character and inner traits into a military personality. On this, as on a granite foundation, everything else is based.

The military personality is not produced through the instrumentality of cut-and-dried influences. It is produced on the basis of definite propensities and in the hard school of military service, through the daily and hourly influence of his superiors, through living in the company of his comrades, and through self-discipline. On this account, the officer aspirants at the branch-of-service school must undergo a course in disciplining. A strictly regulated service from early to late must bring home to them the necessity of punctuality, of freedom from punishment, of accuracy, and of unconditional obedience. The aspirant officer must hourly exercise the practical application of these virtues in order that he may learn to regard them as a matter of course. When he attains the conviction in this manner that the disciplining of the man is the indispensable prerequisite for the disciplining of the soldier and is necessary for all intelligent communal effort, he will later, as a commander, regard the orders he receives as necessities and be able to execute them.

In addition to these mental qualities of the man and those qualities which relate to his habits, the value of the officer is determined by his practical knowledge as a commander. In the development of this knowledge, tactical training occupies an important place. Here the aspirant officer is first convinced that lack of knowledge costs blood in combat. Therefore, he learns that knowledge in this field is a very serious duty and that with every order given to him in combat he is handed

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great responsibility, not only as regards himself but as regards his superior officers and the nation. In this tactical schooling the aspirant officer must learn how to estimate a situation correctly; how, on the basis of this estimate, to make a practical and resolute decision, and then recast this decision into a clear and convincing command.

The imparting of a certain degree of culture is another object of the education and training of the aspirant officer at the branch-of-service school. By this is meant the development of his heart and soul, as well as the ordinary intellectual development. An education which at least comes up to the general average is necessary to the officer for fulfilling his missions. It gains respect for him and imparts authority; it increases the confidence of the man who is destined to become an officer and protects the weaker man from a feeling of inferiority. Intellectual training, in addition, gives him the ability to perceive relationships and to be a good adviser of his subordinates in their life problems.

He who, in the gigantic life and death struggle in which our nation is now engaged,

experiences no feelings with respect to the State, he who does not perceive that it is the idea of the State that must take precedence over all else, is not one with his nation. The officer, as one belonging to the leader class of the nation, is not fulfilling his soldierly mission when he is not an example to and the political leader of his subordinates. Hence, it goes without saying that in the education and development of the aspirant officers, political schooling occupies a very definite place. In addition to the short talks that are given the aspirant officers almost daily concerning the actual events of the moment, particularly the happenings on the front as shown in the official communiqués, the National Socialistic principles are impressed on them more and more through the working out of addresses on political subjects and by instruction and talks on the part of their teachers. Almost weekly, the Party leaders place at their disposal speakers who cast light from higher positions on political questions, thus providing many hours of edification and reflection with respect to matters concerning the nation.

Motor Transportation on the Stalingrad Front During the Fall of 1942

Translated at the Command and General Staff School from a Russian article by
Colonel A. Shevelev in *Tyl i Snabzhenie* (Rear Areas and Supply of
the Red Army) July 1943.

In order to check the advance of the German troops, to harass them by active defense, and to prepare for the decisive blow, it was necessary to deliver to the defenders of Stalingrad, uninterruptedly and in ever increasing quantities, ammunition, arms, food, and reinforcements.

The closer the front moved to the city, the more difficult it became to move supplies and troops by rail. Enemy aircraft bombed railroad stations, bridges, and the road-bed. Troop units could be transported by rail only at night or in bad weather. In daytime, trains moved to the front lines under the protection of our aircraft.

In September and October 1942, when the preparation for the counteroffensive began on the Stalingrad front, the transportation of troops, equipment, and supplies was carried out mainly by the motor transportation units of the General Headquarters Reserve. Hundreds of trucks and cars with troops, ammunition, and military supplies moved day and night toward the front lines. There were days when entire divisions with armament and horses were moved in trucks.

This article deals with the problems of organization of motor transportation, and briefly relates the experience of the motor

transportation units which served the Stalin-grad defenders.

The motor transportation units of the General Headquarters Reserve received their loads at several railroad stations. The average distance to be covered one way varied from 100 to 250 kilometers. As a rule, the trucks traveled over dirt steppe roads which were not suitable for heavy motor traffic.

The most difficult part of the route was the crossing of the Volga. The crossings specially equipped for motor transport had but a limited number of ferries and barges and were unable, therefore, to provide for rapid transfer of the trucks from one bank to the other. Moreover, a ferry could not carry more than thirty or forty trucks at a time, and the loading and unloading of the ferries on the other side took about two hours. As a result, bottlenecks began forming at the crossings.

In order to eliminate these delays and to utilize the available crossings in a more efficient manner, the route of the movement was divided into two stages. A part of the trucks operated on the right bank of the Volga while other transportation units operated on the left bank and transported men and supplies brought down in barges and ferryboats.

The Operations Staff of the Department of Motor Transportation and Road Service of the Red Army directed the work of the motor transport units. Upon receipt of information concerning the movement of military units on railroads and the time of their arrival for unloading at one or another railroad station, the staff sent out the required number of trucks which took the troops to the crossing. From there they were moved to the area of concentration. As a rule, the loading of troops and matériel was done in woods and ravines, from 500 to 800 meters from the railroad. Not more than 100 or 120 trucks were allowed to concentrate in one place.

Before loading the trucks, the representative of the operations staff and the commander of the troop unit to be moved made preliminary estimates, determined the sequence of departure of convoys, and designated trucks for men, horses, and equipment. In order to

avoid confusion, the loading was done by platoons. Each platoon was assigned a truck with a sign on it showing the name or number of the platoon. Men were usually transported in Dodges and Fords; loads and artillery, in ZIS-5 trucks. Dodge trucks were reserved for horses.

Experience has shown that the best way of transporting a division, its matériel, and equipment is not all at once, but in two or three groups. Even when the distance to be covered was considerable the motor transportation units managed to transfer a unit from the train to the crossing and return to the station by the time another unit had arrived. When a train arrived at the station ahead of schedule or before the trucks had returned, reserve trucks were forwarded to the station. They took first the men and their personal arms; then followed artillery, horses, forage, and other loads.

Whenever the transportation staff was unable to supply trucks to load an arriving unit and the troops started marching, their loading into the trucks was effected en route. The arriving trucks loaded the head platoons and then went on to the area of concentration. The loading of troops when on the march was also practiced when the number of trucks was insufficient to transport simultaneously a whole unit and when the situation required a rapid arrival of certain units in the area of concentration. To speed up the transfer, the trucks were supplied with more experienced drivers.

Not infrequently, reconnaissance parties were sent ahead. They determined the condition of the roads, sought shelters for the men and trucks in case of enemy aerial attacks, established repair and refueling stations, and organized traffic control. Whenever the route was not reconnoitered in advance, the commander of the motor column studied it on the map and marked with particular care all bridges and road junctions.

The convoys moved according to schedules worked out by the staff. The average speed was from thirty-five to fifty kilometers an hour. In certain sectors a speed of over fifty kilometers an hour was allowed. After

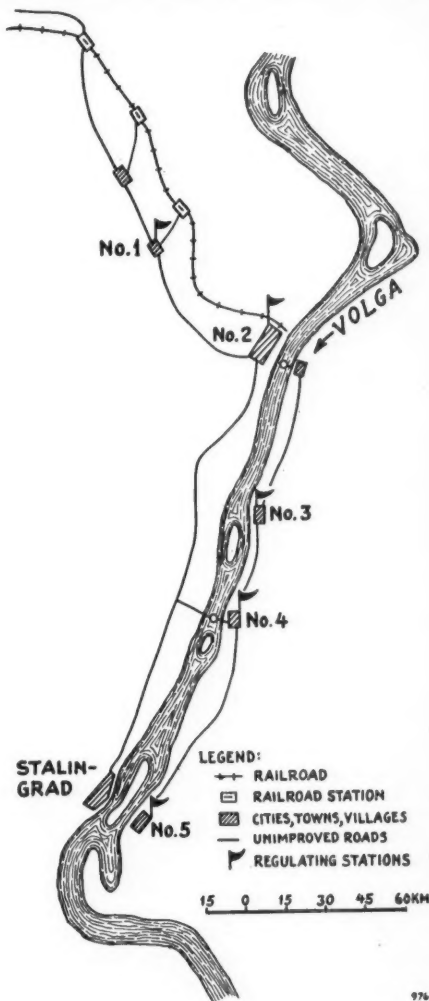
traveling two or three hours the columns halted. The trucks underwent inspection and were refueled. It should be noted that the refueling stations placed at fifty to sixty kilometers from each other were unable, when the traffic was heavy, to refuel all trucks and kept them waiting for a long time. Therefore, a supplementary net of refueling stations was established. These stations supplied gasoline in barrels or cans. Trucks which ran out of fuel en route were refueled from gasoline tanks traveling at the tail of each column.

Repair stations were established on the road at a distance of sixty kilometers from each other. Each station had a repair crew, a type "A" mobile repair shop on a truck, and was supplied with a stock of necessary replacement parts and towing cables. Type "B" workshops were established in larger settlements. Each repair station was assigned a sector of the road, and its mobile repair shops cruised back and forth and helped the trucks which fell behind. The repair stations effected minor repairs. Damaged trucks were towed by the repair trucks and brought to repair stations or to the "B" workshops, while the men and cargo were transferred to other passing trucks. On the whole, the proportion of trucks which dropped out from the columns did not exceed one or two percent.

Experience shows that the repair equipment should be centralized in repair stations and workshops. The repair truck which moves at the tail of the column should have only a minimum number of tools and repair equipment.

Now a few words about the command of the convoys on the march. As was mentioned already, the convoys moved according to schedules which specified the time of reaching the various points and the time of arrival at the crossing and the area of concentration. The transportation staff always had complete information concerning the columns en route. Liaison cars were used for the control of the convoys. In special cases planes were used for the same purpose. Orders to the commanders of the transportation columns were delivered by messengers of the staff or by liaison planes.

When the situation required changes in the route of the convoys, the staff set up command posts to indicate the new route. Within



the convoys, the control was effected by visual and sound communication in daytime and signal lamps at night.

The routes of the movement and particu-

larly the crossings of the Volga were protected by our aircraft. Besides, machine guns for protection against enemy planes were placed on the trucks. In order to conceal from enemy observers the nature of the convoys, the trucks were covered with tarpaulins.

Despite the desperate efforts of the enemy aircraft, the motor transportation units of the General Headquarters Reserve successfully accomplished the assigned missions and delivered a great number of troops and military supplies to the defenders of Stalingrad. This made possible not only the saving of the Volga fortress but also the encirclement and annihilation of the German troops.

Even when the distance to be covered is considerable, motor transportation is able to transfer rapidly and secretly both troops and equipment directly to the zone of operations. The success of the motor transportation, however, largely depends on the precision and perfection of its organization. Hastily assembled trucks, picked up from different

units, are less efficient. It is advisable, therefore, to employ motor transportation units.

In preparing infantry units for transportation by trucks, it is necessary to make in advance all the appropriate estimates concerning the loading of troops and military supplies. If the estimates are not made, or are not specific enough, difficulties in loading and halts en route are inevitable.

Experience shows that motor transportation work functions well only when close collaboration is established between the commanders of the troop units and the commanders of the transportation units. The commanders of the troop units are responsible for the order and for combat security en route, while the commanders of the transport units are responsible for the good working order and servicing of the trucks. Close cooperation between the transportation unit commanders and the commanders of troops, strict discipline en route, and observance of the schedule of movement are the basic requirements for successful motor movements.

Qualities of Leadership

Digested at the Command and General Staff School from an article by Major General Costello in *An Cosantóir* (Eire) May 1944.

IN any leader the strength of his emotions, that is to say of his feelings, is of prime importance. Psychologists are in general agreement that from the point of view of behavior one of the most important innate tendencies in human nature is the tendency to experience any feeling or emotion when or because we observe in other persons the expression of that feeling or emotion. This sympathetic induction of emotion can be observed in action every day.

Provided therefore that a man be capable of governing his emotions, in other words, provided his character and will power are such that he rules his emotions and is not ruled by them, the stronger these are the greater will be his power to influence people, especially people who are in a state of tension as is commonly the case in war.

In recent years various attempts have been made to analyze leadership and to catalogue the qualities which have been found necessary or desirable.

It is thought reasonable to start with the assumption that our potential military leader is a man, and a good man at that; one who has a strong character founded on sound moral principles; one who is prepared to devote himself to the service of his country, that is, one who is both genuinely patriotic and truly unselfish.

A leader has been described as "one fitted by force of character, or ideas, or by strength of will, or by administrative ability to arouse, incite, and direct men in conduct and achievement."

But we do not find the perfect military leader any more than we find the perfect man

in any other walk of life. In some, the prominence of their virtues overshadows their vices and weaknesses. In others, such as Napoleon, the very force of intellect which made them great magnified also these failings which, in lesser men, or men with less power, would have been of small account. And as each man is to some extent the product of his environment, we will naturally find in different ages and circumstances different qualities of character and intellect to have been of greatest value and to have been in greatest demand. Nevertheless, it is possible to arrive at a list of qualities which have enabled men to dominate and inspire others and to lead their followers through the grim ordeal of battle.

Fortitude

Fortitude, says the dictionary, is "that strength or firmness of mind which enables a person to bear adversity without murmuring, depression, or despondency."

In everyday life almost everybody meets trials of one kind or another. Some meet them unmoved and pursue the course they have mapped out for themselves; others not so well endowed with fortitude are deflected to a greater or lesser extent from their course. Any person who has the management of men or the direction of affairs in which he depends upon the collaboration and loyalty of others is likely to meet more than the average share of disappointments. But in war especially there are bound to be many disappointments, losses, delays, defeats, and even minor disasters. The greater the responsibility of the leader the more frequent and the more weighty will be his trials of the kind. The death and maiming of those for whom he is responsible, the destruction of property, the loss of opportunities will weigh heavily upon him. In his day-to-day work so much is uncertain and so much depends upon accident, the loss of a critical message, the death of a key commander, accidents of weather, which upset even the best laid plans, that adversity may be said to be the bed-fellow of the leader in battle. These

are some of the trials common to leaders in action.

And not only must he bear the burden of enemy action, but he must be prepared also to bear the even more grievous burden of slander and misrepresentation. His prominence makes him a natural target for criticism. If he has conscientiously performed his duties he will have had to punish, pass over for promotion, and perhaps remove from office men who are in most cases unlikely to agree that the common good demanded such action. He will have aroused jealousy and envy in proportion as his authority or position is coveted.

It is therefore understandable that General Fuller should commence his brilliant study of Grant as a general with a discussion of the importance of Fortitude which he describes as "the first quality of the General" — "the supreme virtue."

The importance of this quality obviously varies according to the responsibility of the leader. It is the most essential quality in the commander in chief, it is obviously of less consequence in the corporal who has limited responsibilities and who can lean upon a superior who is close at hand. When we reach the point in the scale of ranks at which a commander is likely to have an independent command it becomes important.

There are many notable examples of the necessity for and the triumph of fortitude in the military leader. Napoleon, who himself said that "the first quality of a soldier is fortitude in enduring fatigue and hardship," and that "poverty, hardship, and misery are the school of the good soldier," illustrated in his own early career the importance of this quality. A desperate crisis only increased his coolness and the precision of his thought. His personality "never stood forth so grandly as after a defeat."

Determination

Closely akin to fortitude is determination, which means being earnest and persevering. It is synonymous with firmness and resolution, and in certain circumstances it involves ruthlessness. Decision marks the beginning

of action, *determination holds out to the end*. Fortitude gives calmness in the face of calamity. Determination gives perseverance through all difficulties to the end.

There is no better explanation of the need for determination in war than that given by Clausewitz. "As soon as great difficulties arise—and that must always happen when great results are at stake—then things no longer move on of themselves like a well-oiled machine, the machine itself then begins to offer resistance, and to overcome this the commander must have a great force of will. . . . As the forces in one individual after another become prostrated, and can no longer be excited and supported by an effort of his own will, the whole inertia of the war gradually rests its weight on the will of the commander; by the spark in his breast, by the light of his spirit, the spark of purpose and the light of hope must be kindled afresh in others; in so far only as he is equal to this he stands above the masses and continues to be their master; whenever that influence ceases, and his own spirit is no longer strong enough to revive the spirit of all others, the masses drawing him down with them sink into the lower region of animal nature which shirks from danger and knows not shame."

A leader who shows any lack of determination will quickly lose the confidence of his subordinates. Weakness of will and vacillation are rapidly communicated to the lower ranks, while, on the other hand, the resolution of many a weak character may be strengthened by the firmness of his leader.

The human herd instinctively demands those qualities in its leader which are necessary to the safety of the herd, and in times of danger it has no difficulty in recognizing that determination is one of these qualities, however much it may dislike it in times of peace and safety.

In reading the story of every successful military leader, we find references to this quality of determination. The words used may be inflexibility, will power, sternness, perseverance, steadfastness, earnestness, ruthlessness, pugnacity, staunchness, or

stout-heartedness, but the quality is the same. In the face of the difficulties which commonly confront the soldier, the overcoming of obstacles and perseverance to the end commonly require that the instinct of pugnacity be highly developed. Only those who are ready to fight difficulties and ready to fight battles will attain success. And to fight successful battles the leader requires that subordination of all to his purpose which sometimes earns him the label of ruthless.

Those soldiers who earn the reputation of fighting leaders are those who show determination. The meteoric rise of Sheridan from Lieutenant to Lieutenant General inside four years of war (from Captain in three) was because this great soldier possessed outstanding qualities of leadership. He is described as cold, cruel, and relentless in the prosecution of his battle aims, but we know that in private life he was humane, kind, and generous. Napoleon's determination was a decisive factor in his triumphs. He had the strength of mind to pursue his main purpose despite all difficulties and to disregard all secondary matters, no matter how important they appeared. Again and again we meet examples of his inflexible will and steadfast purpose and of that pugnacity to which difficulties are a challenge rather than an obstacle.

This is a quality which is essential in all grades of leaders from the corporal to the general.

Those to whom difficulties are excuses for inaction instead of a challenge to their will power are unlikely to show in battle the necessary determination.

Physical Courage

Since war is the province of danger, courage has always been recognized as a foremost military virtue. Without that courage which will enable a man to face death unflinchingly, all other virtues are of little value. It were better to have an army of sheep led by a lion than an army of lions led by a sheep. Men will go anywhere and do anything for a fighting leader, provided that he cares for their interests and touches their imagination.

The officers of the British Army, as a class, have not in the last century been noted for their zeal as students of their profession or as trainers of troops. But they have almost made up for these shortcomings by earning the proud tribute that "they could always be depended upon to show their men how to die."

Heroism on the part of the leader creates a spell which binds the minds of his followers. Caesar's prestige and personal magnetism depended largely upon it. We are told that "there was no danger to which he did not willingly expose himself, those who on other expeditions were but ordinary soldiers displayed a courage past defeating or withstanding, when they went upon any such danger where Caesar's glory was concerned." "Caesar never throughout his life knew the meaning of fear." Napoleon's bravery became a legend in his armies, and it is said that in his combative instinct lay the secret of his power over his soldiers.

Sheridan's most outstanding qualities were his energy and courage. It is at least doubtful if he ever experienced fear. He is described by several who knew him as "restless and combative," and by his biographer as being "courageous even to fearlessness." He was the idol of the wild and tough frontiersmen, to whom courage was the first necessity as well as the highest virtue. He had the power, above all men in the American Civil War, of infusing his spirit into an army, and this power depended in no small measure on his courage.

In the vast majority of men, fear is an

emotion to be reckoned with and overcome. Different individuals experience it in different degrees. It is likely to be weak in those whose abounding physical vigor makes them delight in violent action; those who like, in their games and sports, a spice of danger. Some are naturally more timid, and not only is their emotion of fear aroused by trivial things that leave other men unmoved, but the intensity of the emotion is greater. We must take into account that in the normal man it is only common sense to be afraid of real danger. A man becomes brave because, in spite of the natural instinct of self-preservation, he overcomes the impulse to flight and faces danger. The finest kind of courage is the habitual suppression of temperamental fears.

The instinctive tendency to fly from danger is overcome, like all other instincts, by the power of ideals and of sentiment. A strongly-developed desire to do one's duty and to live up to an ideal of soldierly conduct will overcome it in many men, even those naturally timid.

Because the emotion of fear is particularly contagious, any evidence of it in a leader is almost certain to arouse it in all but the most exceptional of his subordinates. Leaders should therefore continuously school their minds so that they will keep themselves well in hand in times of danger and so that even when they are "scared stiff" they will show no signs of fear, but rather display a determination to do their duty regardless of the consequences.

Action of Small Tank Groups During Pursuit

An article from a Russian source in *The Tank* (Great Britain) May 1944.

THE penetration of small groups of tanks into the enemy's positions often plays a decisive role in large scale operations. Taking full advantage of the ground, the time of day, and the weather conditions, small tank groups are able not only to inflict heavy losses on the enemy but to disorganize his troops by disrupting their means of control.

On one sector the Germans were able to regroup their retreating troops, bring up reinforcements, and offer stiff resistance to the advanced guard of the Soviet tank formation. The enemy had time to entrench himself in a number of villages and establish control over an important road junction. The swift advance of our tanks during the pre-

ceding days and the spring thaw had greatly extended their communications, and they had outdistanced the main body of Soviet troops.

A deep thrust was out of the question in the circumstances. Twenty-four hours or more were needed, both for bringing up the tanks that had fallen behind and to carry out the necessary regrouping. But none the less, the situation demanded urgent action. It was important not to give the enemy a breathing spell during which he could strengthen his defenses. But how was this to be done?

It was decided to despatch a small group of tanks led by Major Kucherenko, to act against the enemy's rear.

About dawn, under cover of the mist, the first Soviet armored machines crossed the front line and penetrated behind the German lines. Surprise and audacity were to be their weapons. The tanks engaged the enemy after driving eight or ten kilometers into their lines. The first objective to be attacked was a column of forty or more German trucks. The tanks drove down on it from the flank and destroyed it completely. The tempting thing now was to move on further and meet the main flow of enemy traffic. But Major Kucherenko had other ideas. He wanted to demoralize the Germans, and decided to increase his range of action by attacking the enemy at many points simultaneously. He divided his group up into pairs of individual tanks, assigned a definite battle mission to each, and laid down a rendezvous for the evening.

Maneuvering skilfully, these pairs of individual tanks struck a series of surprise blows at woods, German-held villages, and dumps. Owing to the fact that the tanks zigzagged their way along and their routes crisscrossed frequently, the Germans got the impression that a large tank force had penetrated into their rear. Panic set in. Infantry detachments, motorized and supply

columns made for the roads in an effort to evade the tanks. But it was in vain. Soviet tanks intercepted them.

Disorganization was spreading steadily. It reached its climax when, late in the afternoon, a tank platoon which had been following up the telephone cables, broke into a village where the headquarters and communication center of a large enemy force was located. In less than half an hour the headquarters, the telegraph office, and the wireless station were all smashed. As is usually the case, panic spread not along some definite direction but from the center in all directions. Finally it reached the German forward positions. By morning, the advanced enemy troops, to whom no orders had got through from headquarters, began to prepare for withdrawal. But they were still undecided. At that very moment Major Kucherenko's tanks struck them from the rear. This attack was the final blow necessary to shatter the German defense.

By that time the commander of the task formation had had time to form a powerful task force, to establish contact with troops on his flanks, and to bring up his rearward services. He at once took advantage of the situation to launch a general offensive. The sweep forward of his massed tanks proved to be most effective. On the very first day of this attack the Germans were forced out of their favorable positions and hurled back for a distance of more than fifteen miles.

It will be seen from the above description that the success of the offensive was largely due to the organization of Major Kucherenko's tanks. In the course of the two days' raid this small group had not only disrupted the control of the enemy troops, but undermined his defense system and paved the way for the decisive blow. Major Kucherenko's group carried out their raid on a semicircle with a radius of about twelve miles.

The God of War hates those who hesitate.

—Euripides: *Heraclidae*.

German Artillery in Defense

Translated and digested at the Command and General Staff School from a Russian article by Lieutenant Colonel E. A. Iritski in *Artilleriiskii Zhurnal* (Artillery Journal) July 1943.

IN organizing their defense, the Germans pay much attention to the problem of concealment of their artillery. For this purpose they make extensive use of dummy and temporary firing positions and of roving guns. For roving artillery, the Germans use platoons and batteries if light artillery is employed, and individual guns for 150-mm and larger guns.

The German "Regulations for Battle Employment of Artillery" state: "From the firing positions which are located in the main defense zone and are intended to repel enemy attacks, fire should be opened as late as possible in order to prevent the enemy from prematurely discovering and suppressing our positions." That is why the German artillery fires so seldom from its main firing positions. When expecting an attack of our troops, it displaces continually from one position to another, and eventually comes back to the first one, but never to a firing position which has been previously fired upon.

By the extensive use of roving guns and batteries, the Germans not only conserve their matériel and manpower, but also attempt to create a false impression as to the strength of their artillery, and to conceal the regroupment of their forces. Thus, in one of the sectors of the front, we noticed once an increased activity of the German artillery. Soon we found out that the firing was done by only two roving light batteries and by three adjacent batteries and mortars.

In order to facilitate, according to their regulations, the organization of "a unified and intense fire action" in defense, the Germans use a centralized fire control.

In order to conceal the flashes, the Germans release, at the moment of firing, several flares in front of their firing positions. By doing so they conceal, to a certain extent, the flash of the guns and simultaneously illuminate the forward edge of our position.

To combat our artillery, the Germans use

fragmentation smoke-shells. In addition to the fragmentation effect, the shells produce a smoke blinding our gunners. This smoke also helps German observers. Recently an extensive use of ricochet firing with high explosive shells has been observed.

The Germans pay special attention to the organization of their observation. Observation posts are chosen so as to offer maximum field of vision. This is done in order to watch the actions of the enemy, to observe their own infantry in battle, and to be able to support it at the right moment. Observation posts of the heavy artillery firing at targets in the depth of our defenses may have limited fields of vision.

In order to improve their observation, the Germans use forward observers extensively. They try to approach our forward edge as closely as possible. Their observation posts are local objects, triangulation station towers, cabins of wrecked cars, damaged tanks, trees, houses, and sheds, or simply various terrain features.

The observers operate singly and in pairs. They are relieved twice a day (in the evening, and in the morning).

For observation posts, the enemy uses objects which would not attract attention. In one sector, for example, our scouts discovered an enemy observation post under a hay stack. Under it was a ditch where six men, equipped with weapons and instruments, were located. Often the enemy establishes his observation posts on roofs of houses, in belfries, and less frequently, on hills. As a rule, the observation post is strongly protected and serves simultaneously as a firing emplacement. In a belfry of a church, for example, we found two heavy machine guns.

The Germans attached great importance to observation from balloons, particularly during the first months of the war. Experience showed, however, that in daytime these balloons did not produce the desired

result. They were often destroyed. Recently, attempting to locate by our gun flashes the the Germans started using balloons at night, firing positions of our batteries.

The Battle of Kovel

Translated at the Command and General Staff School from a German article by Major J. Schäfer in *Kölnische Zeitung* 26 April 1944.

This article gives a good description of the difficulties involved in operations in terrain such as that of the Pripet marshes. Unfortunately, the tactical principles are not well brought out.—THE EDITOR.

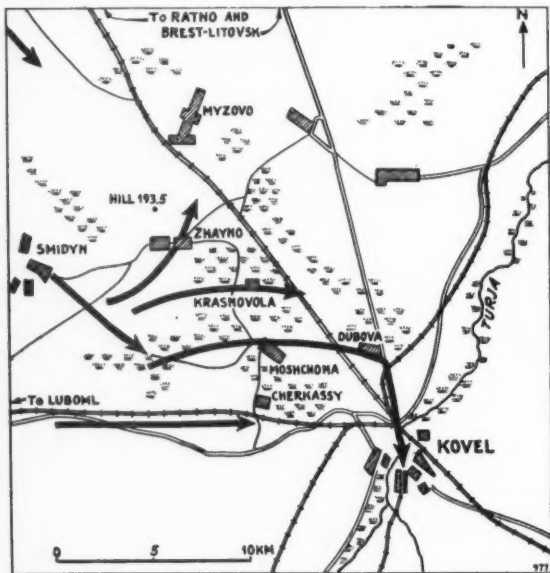
IN the area south of the upper course of the Pripet, the enemy succeeded, during the period between 16 and 18 March, in encir-

west by hurriedly bringing in troops over the Kovel-Luboml railway was attended by partial success only, but was of material significance in the subsequent relief of Kovel. Regular and guerrilla forces had already occupied large areas to the west and northwest of the city and continued to push forward. They not only offered defensive and offensive opposition to the German relief operations but cut off the tip of the wedge.

In spite of the most difficult ground and weather conditions, the attack of the German division gained ground. It got to within a few kilometers of Kovel and, generally speaking, held the narrow corridor against all attacks.

On 30 March, a few German tanks with infantry riding them and followed by portions of a battalion pushed their way through to Kovel, but the waves of the hostile infantry closed in behind them. The tanks which had broken their way through could now be employed as an effective armor-piercing weapon, whereas the surrounded garrison had theretofore been compelled to repel the attacks of hostile tanks with their weak artillery, but mainly by means of successful close combat. This

small group of tanks and infantry held their own in a strongpoint about three kilometers west of Kovel. In the meantime the enemy continued his attacks against the city from the southeast and north with the support of tanks, artillery, and aviation, in the course of which he succeeded in effecting a few pene-



clung Kovel (see sketch), an important railway and highway junction. He narrowed his ring, launched a concentric attack on the city, and with other forces endeavored to push on to the west and especially the northwest, in the direction of Brest-Litovsk.

The attempt to relieve the city from the

trations in the south and east portions. But he was not able to force the garrison to surrender.

In the meantime the German armored corps which was engaged in the area southwest of Brest-Litovsk not only removed the threat to the city on the Bug but also hurled enemy forces which had already pushed far ahead, back across the Pripet and past the Vyzovka sector, thus closing the gap between Kovel and Brest and creating the conditions for the third mission which had been assigned to it, namely, the relief of Kovel.

The fighting was unusually hard. The very designation of the terrain as the Pripet marsh area gives an idea of the demands made here on every soldier, horse, and motor vehicle. Only a few solid roadways lead through this country, which, consequently, can be easily blocked by the defenders. Since these roadways have to cross many marshes, ditches, rivers, and minor watercourses, they were easily cut by blowing up or burning bridges, and delays constantly occurred, for it was always necessary to work at the construction of other emergency structures under enemy fire when fighting was in progress. Both combat engineers and construction troops were faced by many extremely difficult tasks. As a rule, it is impossible to detour to the right or left of the roadway as it is bordered by broad, water-covered areas. It is impossible to fight one's way forward except under great difficulties, regardless of whether it be tanks, assault guns, armored vehicles, or infantry. One can dig in a little only on the highway fill to find some protection from the flanking fire of the enemy. Any one who is wounded here and falls into the water is exposed to the danger of drowning if comrades are not on hand to help him immediately. The few passable roadways influence the combat operations. The guerrillas who were concealed in the marshy terrain were able easily to observe the movements of the German formations and report them by radio. In many sectors, progress could be made only by the use of pneumatic rafts and boats. In freezing weather the rafts could not be launched from the shore, but

had to be placed in the water from the edge of the ice, and there was danger of breaking through before getting onto the rafts. If it was not freezing weather, the marshy areas and side roads were almost impassable, and wholly so for heavy weapons and vehicles. But if a light snow covered the ground, the appearance of the ground was often deceitful and occasioned many unpleasant surprises. At night, actual hard freezing occurred. It is easy to imagine what an effect this produced on the water-soaked winter clothing and the men who were wearing it.

But in spite of all these difficulties and in spite of the resistance of the enemy, the German divisions which were attacking in a southeasterly and southerly direction were at first able to gain ground. Then the defense and counterattacks of the enemy became stronger, and the advance of the German units had to slacken. The blocking of the Kovel-Brest highway south of Ratno especially constituted an extremely difficult obstacle. Consequently, a major regrouping was undertaken, and the relief of Kovel was now carried out with united forces from the west, where an armored division and an infantry division had steadily gained ground.

The situation of the defenders of Kovel became more tense from day to day, for the enemy was determined at any cost to force them to capitulate before the arrival of the relief forces. The air force supplied the garrison day and night, with ammunition, weapons, motor fuel, and food in large quantities. The command in charge of the relief forces waited till the forces which were to effect their liberation were assembled in sufficient strength.

In the early morning hours of 4 April the attack started with the powerful support of artillery, Stukas, and other planes. One combat group attacked south of the Kovel-Luboml railway line thus protecting the armored group which was attempting to effect a breakthrough north of there. North of this division, another armored division and an infantry division were pushing to the east in order to tie up enemy forces there, to broaden the wedge as much as possible, and

to provide cover on the north for the relief group.

The enemy had not failed to note the preparations for the German thrust. He had brought up additional forces, including tanks, and in several places established strong obstacles by the use of antitank guns and mines as, for example, along the Kovel-Luboml railway and along the railway and highway between Kovel and Brest. His air force also was very active. The ground froze during the night, and the roads and ground were more passable till the warmth of the sun turned everything into mud. The southern group encountered very heavy resistance, especially at the obstacles. An assault gun brigade in a small area destroyed thirty-seven guns, seventeen of them of large caliber. But very small gains of ground were made here. The armored group attempting a breakthrough achieved considerable success in spite of great difficulties in its attack toward the east, took the village of Moshchona, beat down the enemy antitank-gun and tank obstacles, and drew near to the Kovel-Brest highway. The armored division which was advancing farther to the north and northwest was also able to gain considerable ground with its two assault groups and took Krasnovola, Zhayno, and the important Hill 193.5. Northwest of this point, the infantry also worked their way forward with good success. The fighting continued into the night. Freezing temperatures again occurred with their favorable effect on the passability of roads and terrain. The rapid success of the operations was to a large extent dependent on this, for now the heavy weapons, at least in some places, could be brought up, and it was easier to begin preparations for the following day.

The 5th of April brought the decision. As the result of powerful enemy counterattacks, a small reverse occurred in the case of the southern group in the area southeast of

Cherkassy, which was to trouble the southern flank of the group effecting the breakthrough. The latter, however, did not permit itself to be influenced by it, but stormed on, again supported by the air force, toward the objective—Kovel. With the combat group of an antitank infantry regiment, reinforced by tanks belonging to an Elite Guard division, it took Dubova after a hard battle, turned southward onto the highway leading to Kovel, beat down all resistance, especially the enemy who defended himself stubbornly in the factory area between the highway and the railroad, pushed into the city, and at 1300 reached the garrison. The corridor which at first was a narrow one was protected on both sides, broadened, and maintained open against all attacks of the enemy. It was now possible to bring the first of the wounded out of the city.

An essential prerequisite for the bold thrust was the screening of the north flank along the railway and highway where surprise enemy attacks could be expected at any moment. This screening was taken care of partly by the group itself, but mainly by the armored division which was fighting farther to the north, to tie the enemy up by attacks directed toward the east.

The 5th of April was a hard but a very successful day. Kovel was still under fire from the enemy who continued to hold his ground to the right and left of the city. The damage in the city testified to the violence of the fighting which the surrounded garrison had had to endure for almost three weeks.

During the following days, the breakthrough corridor was widened and additional parts of Kovel and some areas to the north and southwest of the city were taken.

Although the muddy season, especially in the Pripet area, makes greater military operations difficult or impossible, Kovel remains an important stronghold.

I will have no timid soldiers. He who is not bold and of good heart does not deserve to serve in the Prussian army.

—Frederick the Great.

Middle East Staff College

Digested at the Command and General Staff School from an article in
The Tank (Great Britain) May 1944.

IN a former Palestinian hotel, high up in mountains overlooking the sea, is the Middle East Staff College where many of the more senior officers of the Mediterranean and other theaters of war receive their advanced staff training.

To the general public, it is one of the lesser-known training centers of the MEF [Middle East Forces], but nevertheless a vital one in the present days of amphibious and air warfare when brains are every bit as important as strength.

Here were brought to the surface many of the master minds which sank Rommel in the sea of tactics and made possible the invasion of Sicily and Italy. Many an organizing genius learned, in this Staff College, to develop those powers of administration and planning which are now keeping our armies smoothly supplied and maintained. Here, too, were forged some of the links which tie the Army and the Air Force into one effective striking force; for although the Middle East Staff College is comparable with the Intermediate Staff Colleges at Quetta [India] and Camberley [England] and carries on their same fine traditions, it is unique in that the students and the directing staff are drawn from two services.

Today there are large numbers of Army and Royal Air Force students learning to be staff officers of the Grade 2 (Major) level, or its equivalent in the RAF. They are a cosmopolitan gathering drawn from the United Kingdom, U.S.A., North Africa, MEF, Southeast Asia, and Syria, as well as from the battlefields of Italy and the aerial battlefield of Western Europe. Side by side, officers of many Allied nations—both Army and Air—study the practical problems of warfare. There are British, Canadian, Australian, New Zealand, South African, Rhodesian, Indian, and other Empire countries represented. In addition, most of the Allied nations, including Poland, Fighting France, Jugoslavia, and Persia have sent officers, as

also has the Royal Egyptian Air Force. The prestige of the Middle East Staff College stands high and Allied armies are keen to send their more promising officers there.

The average age of the students is a little more than thirty and that of the directing staff or instructors (all of whom are of the rank of Lieutenant Colonel, Wing Commander, or above) only a year or two more. All directing staff and students are men of experience in Army or RAF matters, and it is a special feature of this college that all are able to meet and pool their ideas and knowledge. At no other military college in the world is there such a representative gathering of experienced campaigners. Mention Eritrea, Madagascar, El Alamein, Mareth, Singapore, Crete, the Ruhr, the Battle of Britain, or any other noteworthy campaign or battle, and either the directing staff or one of the students will be able to say, "I was there."

The system adopted for instruction and discussion is based upon syndicates of seven or eight students who work under the guidance of the directing staff. Each student takes it in turn to be chairman of the syndicate when discussions are taking place on a précis or lecture. As far as possible each syndicate is organized so as to embrace men with knowledge of varying types of warfare and from as many different arms as possible. In this way teamwork is encouraged and the staff officers of the future learn to appreciate and understand the other man's point of view.

Particularly is this pooling of experience encouraged as between airmen and soldiers. They are told on arrival at the college that they are there to give as well as to receive.

The Middle East Staff College has been running since 1940. Its site was specially selected by Middle East GHQ as being ideally suited to all-the-year-round training in association with the Royal Air Force. It is close to the sea, for cooperation with the

Royal Navy, and in the middle of some of the most perfect battle-training country in the world. The main premises, a former hotel, are excellent. They include two large lecture halls, museum of enemy equipment, map room, a series of syndicate rooms, reference library, offices for the commandant and directing staff, as well as adequate messing accommodation for all.

The students sleep in nearby blocks, each named after noteworthy commanders—Wavell, Tedder, Cunningham, Auchinleck, Plaft, Freyberg, Blamey, etc. Several months hard work is tempered by vigorous exercises, for it is impressed upon them that physical fitness is as essential as mental alertness.

For purposes of training, the college is divided into three wings—Nos. 1 and 2 are Army, and No. 3, Royal Air Force. Instruction is, of course, largely secret, but it may be said that to begin with, the Army students study staff duties and the organization of the RAF and the different arms of the service. Then, staff duties required in the various phases of war, and internal security, followed by instruction in the training of troops. The RAF students also learn staff duties and Army organization, followed by exercises

dealing with the different RAF commands. Later in the course, both Army and Air Force officers are instructed in combined and joint exercises. Army and Air Staff administration are studied together and there is no differentiation between the various types of work or between the members of the directing staff.

Just as every care is taken over the selection of candidates for the Staff College, so very careful attention is paid to the appointing of the directing staff. These officers are dealing with acute brains which require an equally high standard of intelligent instruction.

At the end of the course, the students are placed in a "pool" ready for posting to various army and air duties. They fill such appointments as Brigade Major; General Staff Officer 2d Grade; Deputy Act. Adjutant General; Deputy Act. Quartermaster General; either in field formations or static areas.

So it is, equipped with hard experience, careful training, and friendly words of advice, the students leave to become second grade staff officers, or "G.S.O. 2's," as they are known in the Army.

Russian Guerrillas

Digested at the Command and General Staff School from an article by Captain Sean Feehan in *An Cosantóir* (Eire) May 1944.

THE following account of Russian guerrillas operating with the Red Army shows not alone the value of harassing tactics, but of the very active and useful assistance which can be rendered by guerrillas to a regular force:

"With the launching of the Red Army's summer offensive of 1943, the guerrilla movement swung into still more closely coordinated action against the invaders. Besides the formidable people's army operating in accordance with a definite plan in the enemy's rear, smaller detachments and groups, acting independently on their own initiative, take a daily toll of German troops and armaments, and interrupt enemy communications.

"The experience they have gained in guerrilla warfare and the highly developed system of guerrilla tactics enable the detachments to fight in closest accord with the Red Army. No sooner do the Germans try to shift troops along some railway line than the guerrillas appear, tearing up rails and blowing up bridges.

"While the Germans were conducting their offensive, the guerrillas' efforts were devoted to diverting the enemy's forces, but as soon as the Red Army launched its great attack, the guerrillas, too, passed to the offensive. In July 1943, guerrillas exterminated tens of thousands of Germans, derailed hundreds of

military trains, destroyed 158 tanks, 1,310 motor vehicles and fifty-one ammunition dumps. They held the German rear under constant threat.

"Particularly valuable was the help rendered the Red Army by guerrillas at the rivers Desna, Dnieper, and Pripet. The guerrillas moved towards these lines when the front was still far away. Long before the Red Army approached the rivers, they massed their forces in the forests and villages, decided what crossings were to be seized when the moment came, and prepared boats and rafts in readiness for the Soviet troops, keeping them under strong guard.

"The Germans, retreating before the Red Army, were confident that full facilities for crossing the rivers awaited them and that as soon as they had crossed they would be able to destroy the bridges and ferries. But scores of the crossings were already in the hands of guerrillas, who, moreover, had constructed a number of ferries themselves.

"Coordination between the operations of guerrilla detachments and the Red Army's offensive grew ever closer. Near the village of Kozintsa, on the left bank of the Dnieper, guerrillas helped the Red Army advance troops to surround and annihilate an enemy

rearguard. This later enabled the entire army formation to cross the river. In another sector, guerrillas covered the flank of the Soviet troops as they were crossing the Pripet, while another detachment harassed the enemy rear and hampered the movement of reserves and ammunition.

"The guerrilla tactics were varied. They mined roads in the enemy rear. They laid ambushes. They occupied villages which might have served as bases for enemy forces being brought up from the rear. And all the time they struck hard at German communications. The effect of their blows was felt at Kiev, Korosten, Shepetovka, and other railway junctions. On two sectors alone 281 enemy trains were derailed. These blows were coordinated with those delivered by the Red Army from the front and prevented the Germans from massing their forces where and when they had planned."

This account was written by a Russian war correspondent, Timofei Strokach. It shows that today more than ever guerrillas hold their own in war, and it serves as an example of what a guerrilla force, working in close cooperation with a regular force, can do.

"Stalin's Organ" and Other Rocket Weapons

Translated at the Command and General Staff School from a German article in *Pester Lloyd (Abendblatt)*, Budapest, Hungary, 29 March 1944.

THE range and accuracy of rocket projectiles have been considerably increased, and in the present war they are already playing an important role as combat weapons. Two types of this weapon are described in this article: the "Stalin's Organ" and the anti-aircraft rocket projectiles.

That at times over-estimated combat weapon, the "Stalin's Organ," consists of a tank chassis, the launching apparatus which holds a considerable number of large rocket projectiles (often as many as seventy-two), and the electric ignition apparatus. The howling and whistling of this great number

of rockets of various calibers, which are discharged either all at the same time or in rapid succession, produced—especially at first—a considerable moral effect, particularly since this howling hurricane can be varied, and it was this very thing that gave the weapon the name of "Stalin's Organ." The rocket consists of the high-explosive projectile and the rocket shell, which is filled with the propelling charge. In a projectile weighing forty-two kilograms, the propelling charge weighs seven kilograms. When the rocket strikes the target, the projectile weighs thirty-five kilograms, six kilograms of

which is the explosive charge. These projectiles have a range of up to six kilometers. They are provided with fins for guiding them in flight and, since they travel much more slowly than artillery shells, they are much more slender than the latter in order to be able to respond to the action of their fins and remain on their course. The length of the forty-two-kilogram rocket we have just mentioned is almost one and a half meters and its caliber is 130 millimeters.

Ordinary projectiles of the same caliber—especially of the same weight—would belong to heavy artillery and the corresponding guns with all accessories would weigh from five to ten tons and more. The "Stalin's Organ," in contrast with this, is able to release a dozen such projectiles at the same time, and it is much lighter and easier to move than a heavy gun. It is, therefore, easily put into action, and can be quickly withdrawn from combat.

The effect of the rocket projectile may be compared to that of a gigantic hand grenade. This is the more true since a rocket is accelerated slowly and evenly by the backward-rushing propelling charge, and experiences no shock on being discharged as is the case with ordinary shells. Hence, not only far more sensitive and at the same time more powerful explosives can be employed but also several times as much can be loaded into them. Because of the relatively gentle propulsion of the rocket, thin-walled cases may be used with a correspondingly greater capacity. It is not, therefore, through their power of penetration (it is but slight) but, above all, through their explosive force, especially the detonation wave, that the effect of the rocket projectile of the "Stalin's Organ" is produced.

All this is true for the majority of rocket

projectiles, including the German projectiles which were developed later than those of the Russians. At first, the German rockets were smoke-generating projectiles to be used in planned withdrawals. Later, incendiary rockets and high-explosive rockets came onto the scene. One of the simplest types consists of only six launching tubes. The tubes have spiral guides which impart a rapid rotation to the rockets. This assists greatly in the stabilization of their flight. While the "Stalin's Organ" is effective mainly when used against extended targets—troop concentrations, close-range targets, etc.—the German rocket salvo gun, because of its greater accuracy, may also be successfully employed against smaller targets.

Recently, the German rocket weapon has been most frequently mentioned in connection with its use against bombing formations. These rocket projectiles are fired from two-motored pursuit planes into the bomber formation from a distance of about two kilometers, or from a distance at which machine-gun fire is hardly of any effect. When they are discharged, the rockets leave a 200-meter trail of smoke behind them. They cover the distance in about six seconds. The explosive charge is larger and more effective than that of even the heaviest of antiaircraft projectiles.

Powder-propelled rockets have their disadvantages: they are not equal in accuracy to the ordinary shell fired from a gun, and the rocket gunners are still haunted by the specter of a premature explosion of the charge owing to so-called hair-cracks in the pressed powder charge. Yet with all this, powder rockets are able to handle assignments that are impossible for any other type of weapon and constitute an excellent complement to the artillery.

Long-Range Rockets

Translated and digested at the Command and General Staff School from a German article by Alfred Stettbacher in *Neue Zürcher Zeitung*, Zürich, Switzerland, 8 March 1944.

IN utter contradistinction to the projectile shot from a gun, the rocket traverses the

lower levels of the atmosphere at lesser speed and, as its speed increases, penetrates into

the regions of increasing rarification of the stratosphere and finally into interplanetary space. The recoil speed is, in this case, proportional to the velocity of discharge of the burning gases and the quantity emitted per second. It will increase continuously from second to second as long as the supply of the combustible lasts. As a propellant, the black powder of fireworks rockets, which is of low energy, is not suitable. The most efficient fuel would be gasoline burned with liquid oxygen in the ratio by weight of 1:3.5. In time of war, in place of highly volatile liquids only solid, ready mixed charges are employed, such as nitroglycerine powder which, however, produces but 1,250 kcal/kg [kilocalories per kilogram: a kilocalory is the amount of heat required to raise the temperature of 1,000 grams of water 1° C] with a discharge velocity of 2,500 m/sec [meters per second]. Professor Ackeret showed, using as an example the type of rocket designed for dropping from planes (Figure 1), that if the hundred kilograms of nitroglycerine powder is ejected at a uniform rate (a pyrotechnic problem in itself!) within the space of five seconds, an acceleration of 100 m/sec and with it a total final velocity of 500 m/sec can be attained. This speed, which in itself is small, is calculated for a Stuka bomb which, released at a height of two kilometers, reaches the target in five seconds of time and with a speed of 654 m/sec, striking a blow of 9,700 mt [meter/tons], while the normal aviation bomb requires twelve seconds to reach its target at a speed of 233 m/sec and strikes with a force of only 1,480 mt. To what extent the striking force of the self-propelled bomb represents an advantage as compared with the ordinary bomb with its three-times-greater explosive charge, is again a question. But it is generally accepted that such a rocket bomb the flight of which, in addition, can be controlled over short distances, with only fifty kilograms of explosive charge, will deal a mortal blow to the greatest battleship if, after passing through the deck armor, which may be as much as twenty centimeters in thickness, it is able to penetrate afterwards

into the boiler room or ammunition magazines.

It is rather simple and easy to produce the rockets which start from the ground and fly with a fairly flat trajectory into the enemy's lines. The difficulties increase tre-

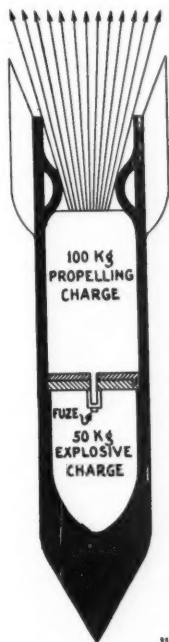


FIGURE 1.

Antitank rocket by J. Ackeret, to be dropped from planes at 432 km/h (120 m/sec) from a 2,000-meter altitude. Body of projectile, 400 kg. Total weight, 550 kg. Caliber, 30 cm. Final velocity on reaching target 5 seconds later:

Acceleration due to rocket's action, 5×100	500 m/sec
Acceleration due to gravity, $5 \times g$	50 m/sec
Velocity of flight	120 m/sec
Resistance due to atmosphere	16 m/sec
Final velocity	654 m/sec

mendously, however, as soon as long-range combat distances are desired of a rocket.

Using the long-range Paris gun and a propelling charge of 200 kilograms of some 1,100 kcal/kg, a 21-cm projectile weighing 105 kilograms and containing seven kilograms of explosives was hurled some 120 kilometers with fifteen percent useful effectiveness. How

large a propelling charge would the same projectile in rocket form require at the same range? How long and how heavy would a rocket have to be when fired in order to strike the target 120 kilometers away?

We can hardly go wrong in assuming that our long-flight rocket requires at least 200 kilograms of the aforementioned 1,250-kcal/kg propelling powder. To get this amount at an almost maximum specific

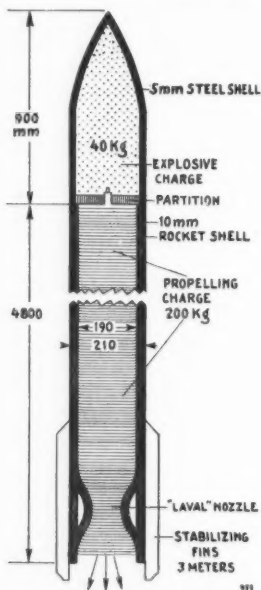


FIGURE 2.

Schematic diagram of section of a rocket projectile with 120-kilometer range.

gravity of 1.5 into the 21-cm shell (19-cm interior diameter with walls ten millimeters in thickness) would require a cylindrical tube of not less than 4.8 meters in length. Then we should have additional parts on both ends which would increase the length: the 90-cm head with about forty kilograms of explosive charge and, at the discharge end, the stabilizing fins at least three meters in length, so that our rocket projectile would have the respectable length of almost nine meters (Figure 2).

The steel case for the burning propelling charge, because of the danger of its melting, would have to be at least one centimeter in thickness, while for the head with the explosive charge .5-cm steel would do. This reduction in weight would move the center of gravity somewhat to the rear, thus increasing stability in flight to some extent. If one considers, in addition to these portions, the weight resulting from the partition wall, the reinforcements of the highly heated exhaust nozzle, and the stabilizer, we obtain at least sixty kilograms together with the explosive charge; hence over 100 kilograms of net weight to be carried.

If we now assume that the 4.8-meter propelling charge is burned in sixteen seconds—which corresponds to a mean rate of burning of thirty centimeters of length or 12.5 kilograms of powder per second—and the acceleration reaches the high figure of an average of 100 m/sec, then, at the end of sixteen seconds of time, taking gravity into consideration as well as the materially lesser resistance to its flight by the air (as compared with the rapid artillery projectile), the final velocity would amount, perhaps, to 1,400 m/sec. But with this speed, the rocket is flying through a region of the atmosphere where there is only from a third to a fourth the normal pressure (one fourth at a height of 10.3 kilometers), while the velocity of our long-range shell at the same point has probably already dropped to 1,300, perhaps to 1,200 m/sec or lower. Up to this point in its flight, the rocket would give a decidedly better performance than the artillery projectile. But from this point on the resistance of the atmosphere would oppose the movement of the hollow, rough body of the rocket with its almost eight meters of length to a greater extent than the short, highly polished, finless shell. During the long period of their rise, therefore, ballistically both projectiles should be much alike, but in the descending branch of the flight, as the air resistance increases, the path of the unwieldy rocket will be more shortened so that, taking everything together, the use of propelling charges in artillery guns and in the rocket guns for the

propulsion of projectiles are of the same effectiveness unless we succeed in finding propelling charges of 1,600 to 1,800 or even 2,000 kcal/kg to use.

For the launching of the 200-kg rocket some sort of additional force (catapult) is necessary since the initial reaction is not sufficient to lift it off the ground. At the same time, especially in the case of gentle launching from light tubes, one has to count on the possibility of oscillating flight accompanied by increased air resistance, since the center of gravity of the long rocket at the moment it is ignited is located in a particularly unfavorable place, near the middle, and not till later, when the charge has burned out, has it moved forward close to the head (like a crossbow arrow). Hence, the production of a charge in the form of a 4.8-meter column, which burns at a steady and uniform rate

within a closely limited space of time, while the pressure conditions constantly change due to increase of magnitude of the hollow space, belongs among the almost unsolvable problems of pyrotechnics. The result of this is either too slow or too rapid a discharge of the gases. In the first case, insufficient acceleration is produced; in the second case, too great a strain is created on the case of the rocket. In addition to this, in the case of long cylinders of propelling charge, there is always the danger that local overheating will be produced as a result of "whimsical" combustion, and the charge will go up suddenly by detonation. And lastly, the direction of flight—even when the center of gravity is favorably located—is very difficult to maintain for the reason that even small changes in the nozzle (one-sided burning or melting) deflects the stream of gases.

Retrograde Movements of German Divisions and Regiments

Translated and digested at the Command and General Staff School from a Russian article by Lieutenant Colonel V. Skokov in *Voyennyi Vestnik* (Military Journal) July 1943.

GENERALLY speaking, German retrograde movement is composed of a series of delaying operations which may be classified as follows:

1. Disengagement from battle and withdrawal.
2. Delaying action in successive positions.
3. Strong resistance in certain sectors.
4. Limited offensive action.
5. Demonstrative action.

For this reason, when the Germans retreat on a broad front, one seldom encounters well defined types of withdrawal, resistance, or attack. All types of action are alternated in time and in space. By doing so, the Germans attempt to maintain a uniform movement, to utilize the element of surprise, and to deny the enemy the information of their intentions and operations.

Retirement of Divisions and Regiments

The German infantry division retiring with

delaying action moves, as a rule, within a zone which is twice as wide as the division frontage in defense. The width of the zone varies from twenty to thirty kilometers.

Successive positions for delaying action are usually spaced from fifteen to twenty kilometers apart. Not infrequently, the distance between the successive positions equals the distance the division can march in a day. Successive positions for the main body of the division are designated only when the covering forces are unable to hold the enemy.

The strength of the rear guard covering the retirement may be as large as three battalions; one from each regiment. The rear guard is reinforced by reconnaissance elements and special combat groups. The latter are formed by the division commander if the division is disorganized and worn out by long marches and battles and when its units are depleted numerically. They operate till the forces of the division are reorganized.

The infantry regiment retires within a zone from six to nine kilometers wide. Depending upon the terrain, it moves along one or two roads.

It disengages from the enemy by battalions. The withdrawal of the battalion is covered by one of its companies. When the main forces of the regiment succeed in disengaging from the enemy, further movement is accomplished under the protection of the combat groups or of the rearguard battalion with reinforcing elements.

The regiment retires to the rearward position at once, or moves from one successive position to another. Successive positions are spaced from seven to nine kilometers for regiments, and from two to four kilometers for battalions.

The division retires according to a definite plan. The order of the commander specifies:

1. Time and sequence of disengagement from the enemy.
2. Rear-guard units—how reinforced; how long to delay the enemy and positions they are to hold up to a designated time.
3. Location of next position—time it is to be ready; units which are to occupy it first and to hold it until the arrival of the main forces; plan of reconnaissance of the new position.
4. Measures to repel enemy attacks during retirement.
5. Order of displacement of artillery; new positions and observation posts; plan of artillery support for the infantry.
6. Successive positions for the regiments for securing the withdrawal and retirement of the main forces of the division.
7. Routes of movement.
8. Control of movement.
9. Assembly areas for services and trains, and order of their displacement.
10. Signal communication during retirement and in the new position.
11. Measures to protect the flanks.
12. Cooperation of all arms.

Order of Retirement

The Germans believe that many battles are lost because the commanders think they

are lost. For this reason, local defeats are not to be taken as an excuse for retirement. Their instructions insist that the commanders should patiently wait for the complete results of the battle and should not order a withdrawal simply because the neighboring units are reported to be withdrawing.

The decision to retire and the beginning of the movement are reported to the higher commander.

Retirement is carried out in a definite order. The first units to be retired are those whose rear installations and lines of communication may be threatened by the retirement of the neighbors. Then the units in the sectors in which the enemy is most active are withdrawn. It is believed that a hasty withdrawal from an active sector is likely to jeopardize the safety of the adjacent units.

When the enemy is active all along the front, the sequence of withdrawal is especially important. The Germans insist that the flanks of the units adjacent to the withdrawing unit should hang over the advancing enemy, so to speak, thus creating favorable conditions for counterattacks against the flanks and rear of the pursuing force which will then be compelled to consider the threat on its flanks. For this reason, the front of the withdrawing German units is seldom linear but always with extensions toward the enemy. The flanks are secured by the following measures: (1) timely occupation of successive positions situated at an angle or parallel to the movement of the retiring units; (2) mutual reporting and joint protection of the limiting points of successive and main defense positions.

For successful disengagement, the following methods are used to confuse the pursuer:

The covering force does not lower the normal intensity of fire and frequently sends out reconnaissance parties in order to create the impression that the position is normally manned.

When the artillery displaces to the rear, a number of roving guns are left behind to continue firing from the abandoned firing positions. This creates the illusion that all the batteries are still in their positions.

All radio stations continue to function in the same nets and from the same locations as long as possible.

In the sectors adjacent to the withdrawing units, the Germans sometimes undertake limited offensive operations.

The evacuation of rear installations, services, supplies, and equipment is carried out at night or under the protection of aircraft which interferes with the enemy's reconnaissance of roads.

The burning of populated places and demolitions within the areas observed by the enemy are done by covering forces during the last minutes of the withdrawal.

Before the withdrawal, reconnaissance and survey detachments as well as the garrison are sent to man the new position. Then follow the trains and part of the heavier artillery. All trains are formed in one column and furnished security units if necessary. When the artillery retires, at least half of its batteries are left in their positions to support the infantry.

The main forces withdraw usually at night or under the protection of a smoke screen. To disengage successfully and to increase the distance from the enemy, the German Command recommends the following: (1) make long marches; (2) do not halt voluntarily to resist the enemy; (3) form as many road march columns as possible; (4) maintain march discipline especially in the rear columns; (5) organize beforehand traffic control at intersections, defiles, and bridges; (6) inform retiring units as to their boundary lines and indicate roads to follow; (7) organize antiaircraft defense in defiles and near bridges; (8) build obstacles in defiles and destroy bridges in the rear of the retiring units.

Special officers, wearing distinguishing insignia, are assigned to regulate traffic.

Covering Forces

To cover the retirement movement, special units from the main forces are assigned which maintain contact with the enemy.

When the morale of the retreating troops is low, these units are either reinforced by

fresh troops or made up entirely of fresh troops. If old units cannot be relieved, fresh units occupy positions to the rear of the units to be relieved, let the withdrawing troops pass, and then meet the advancing enemy.

Units assigned to the covering force are formed into combat groups ranging in strength from a battalion to a regiment. They are reinforced by attached artillery, anti-tank weapons, and sappers.

When the retirement is effected on a broad front, a centralized control of the combat groups is difficult, and the groups, therefore, act independently. The cooperation of these groups and of the units they cover is achieved by mutual knowledge of their missions.

The group commander receives the following information: time of withdrawal of the main forces and of the group; what to do if the enemy attacks before the expected time; operations after the disengagement of the main forces from the enemy and before the covering group is attacked.

When the enemy notices the withdrawal of the main forces and attacks, the covering group is to hold the position until a designated time. The position must be held irrespective of losses and even to the last man.

If the enemy is unaware of the withdrawal, the covering groups, depending on whether or not the new position is prepared, either simulate normal defense activities in the old position or withdraw to the new position.

Methods used by the groups vary: mobility and speed are combined with surprise. They are not to engage in long and decisive action with the enemy, but simply to hold him till the designated time. To enable the covering group to disengage quickly, mostly mobile troops are used for this purpose.

To hinder or prevent parallel pursuit, the Germans withdraw on a wide front, build various obstacles on parallel and connecting roads (letting their own troops know about it), occupy all successive positions on time using mobile units with reinforcing means (especially antitank), and use assault and

bomber planes against the advancing columns of the enemy.

Signal Communication

Radio and light signals are used very extensively. All telephone lines are removed. Lines needed for the retirement maneuver are later destroyed by the covering force. Wire in the new position is laid by the units retiring first.

The wounded are cared for by special medical units withdrawing with the covering force. They try to evacuate even the killed.

Supply of ammunition is taken care of beforehand. Ammunition dumps are established along the roads in the vicinity of successive battle positions.

When the Germans retreat, everything is burned, destroyed, or taken away.

Retirement in Winter

Snow cover, the limited number of roads available, and their low passability make retirement on a wide front difficult. More time is required to evacuate the troops than in the summer. The decision to retire, therefore, should be taken beforehand, for a delayed decision may mean losses in matériel and manpower.

Winter creates favorable conditions for parallel pursuit by ski units, for their emergence near important points used by the retreating forces, and for the encirclement of separate columns. The danger of flank attacks is also increased. Because of this, all populated places are converted into strongpoints with all-around defense. Trenches are made of snow. All roads are protected by patrols. All important points and intersections are occupied previously by specially assigned units. The latter are to hold these points to secure the retirement of the main forces. Special detachments are also formed to be dispatched in any direction during the withdrawal in order to deal with the encircling units of the enemy.

Rear guards are reinforced by sappers who build obstacles on the threatened flanks.

Mutual support of columns marching along parallel roads is almost impossible in winter. The columns and rear guards act more

independently. Hence, they are given more attached light artillery and sappers.

Distances between the marching columns are increased. All roads are well protected by antiaircraft artillery and machine guns, and all means at the disposal of the infantry are used to combat enemy aircraft.

Because of the slower movement of the main forces, the rear guards fight stubborn engagements. For this reason, the units comprising rear guards are stronger in winter and are usually reinforced by units equipped with skis.

The pursuer is also slowed down. Especially important is the construction of obstacles on roads, in intervals between strongpoints, and on the flanks.

Delaying action is confined to holding populated places and roads. Spaces in between are protected by patrols and reconnaissance units.

The artillery is placed near roads to facilitate its displacement.

In winter, the Germans often change from delaying action to limited offensive action.

Delaying Action

The purpose of delaying action is to facilitate planned retirement and to wear out the enemy.

The spacing of positions for delaying action depends upon the following factors: the strength of the defender, terrain, visibility, the enemy's action, and the mission. In open terrain, the positions should be selected at such distances apart that the enemy will be forced to displace his artillery, change from battle to march formation, and then again assume the former formation for the renewal of the attack.

In order not to reveal the true direction of the retirement movement, the location of positions in relation to the routes of retirement should be at an angle, but not perpendicular to them. Sometimes, successive positions are selected off the roads at an angle or parallel to them. Most favorable positions are those which command excellent observation and have good fields of fire over the approaches. Areas covered by vegetation, which helps the

troops disengage unnoticed and move to the next position, are also considered favorable.

As soon as withdrawal is ordered and the position to be occupied is designated, the latter is immediately reconnoitered and manned by a small garrison. The garrison prepares the position for defense, defends it in the event that the enemy appears on the route of the retiring units, and assists in the occupation of the position by the main forces. If the garrison is an independent unit, it is usually detailed as reserve and placed in the center of the defense zone to enable it to repel the enemy attacking from any direction.

The delaying action position, because of its wide frontage, is not deep. It is divided into sectors, subsectors, and strongpoints located in populated places and near roads. The position is protected by antipersonnel and antitank obstacles. All fortifications are of light field type, constructed beforehand, frequently by the local population. The trenches are narrow and deep.

The fire plan is based on mutual flanking fire support of the strongpoints.

Infantry heavy weapons are distributed as follows: single heavy machine guns (in the depth of the position, heavy mortars), two or three in each strongpoint; the mortars have a number of alternate positions and observation posts; firing positions of the infantry artillery are in the main zone of defense, in places affording protection from tanks (positions are selected jointly by the infantry battalion commander and the artillery company commander); firing positions of antitank guns are in the strongpoints.

Much attention is given to the use of standing barrages. The artillery establishes as many reference points as possible. All infantrymen are advised as to the location and type of these points. Artillery fires are usually massed.

The mission of the artillery is to prevent the enemy from approaching the main line of resistance, and to break up, by massed fires, the enemy's preparations for attack.

The right time to cease battle and to continue the withdrawal is when the enemy has deployed and disposed his forces for attack,

but has not yet attacked. The more open the terrain, the sooner the Germans disengage and move to the next position.

Strong Resistance

The Germans change from delaying action to strong resistance when the enemy upsets their plans of retirement. Such defensive action occurs in the sectors the possession of which secures a well planned retirement on the whole front. The change from delaying action to the defensive can be effected very quickly, according to the Germans. Defensive positions for this purpose are organized beforehand, or one of the delaying action positions becomes a defense position. Either fresh troops or the best of the withdrawing units are given defensive missions.

The length of time the position is to be held is not specified in the order. It is not recommended to inform the troops that the defense will be only temporary.

Limited Offensive Action

Limited offensive action is undertaken to gain time for the retiring main forces and to divert the enemy's attention from the sector where withdrawal is about to begin. Depending upon the situation, attacks are directed at the enemy's flanks, rear, or weak sectors.

To take full advantage of favorable circumstances, all subordinate commanders are allowed to exercise their initiative in deciding when to attack.

Demonstrative Action

Demonstration engagements are either defensive or offensive, and are conducted by small forces on a broad front. According to the German instructions, such engagements are undertaken when the enemy does not suspect that these are only demonstrations, and when aerial reconnaissance is difficult.

The Germans are convinced that the enemy can be confused as to the actual purpose of the battle by the action of heavy artillery and heavy infantry weapons. But to do this in open terrain for a long period of time is very difficult, even if all necessary measures against enemy reconnaissance have been taken.

Modern Bengal Lancers

Digested at the Command and General Staff School from an article by Major W. G. Hingston, 1st Punjab Regiment, in *The Army Quarterly* (Great Britain) April 1944.

LAST December it was disclosed that several Indian regiments were fighting in Italy with the Eighth Army. The press evinced no interest whatsoever in the 8th and 15th Punjab Regiments, in the 5th Mahratta Light Infantry and the 5th Royal Gurkha Rifles. The one publicity point was the "Bengal Lancers" in Italy, and many will realize how little information this name gave to the enemy. It did, however, conjure up a gay picture of horses and lances, gorgeous uniforms and military bands, all under the burning Indian sun. How different was the reality! Battle-dress and black berets, tanks and armored cars, bitter cold and deep mud under a gray, weeping sky.

The Indian Army is, of course, every bit as up to date as the British Army and is equipped on the same scale. Some years before war started all plans had been made to mechanize units in India, but vehicles, arms, and equipment did not arrive. All were required for the home forces and later for replacing the Dunkirk losses. The Army in India therefore lagged behind. Those divisions sent to the Middle East were brought up to the correct scale, but the 4th Indian Division, both British and Indian units, drove through the biting cold of the desert winter to the victory of Sidi Barrani dressed in shorts. This division completed its first two campaigns before it received the new 25-pounder or saw a tommy gun.

There were many who maintained that the sepoy could never be trained to master the intricacies of mechanization. He was ideal, it was said, for the simple orthodox warfare of the Northwest Frontier, but his brain would not be able to cope with the internal combustion engine and modern arms. He would not be able to stand the strain of dive-bombing, tank attacks, or the speed with which everything moves nowadays. This was not the view of the British regimental officer, and his belief was justified.

The sepoy (and sowar) has taken to mechanization in a manner that has confounded the critics but has drawn no apology from them. He naturally takes longer to train than a British soldier, for in many cases his sole knowledge of motors has been the sight of a very occasional bus. Once he has learned to drive and maintain his truck and lorry he has shown himself first class at the job. He does not regard the lorry as something which can be replaced if it gets damaged but as something to be cared for and kept on the road as long as possible. He is careful and painstaking, loving his vehicle in the same way that he loved his horse or mule.

Pride in the mastery of a weapon is still a great characteristic of the sepoy, whether it be with the rifle and bayonet, the mortar, tank, or tommy gun. The tradition of the shame of losing arms is still strong.

The Indian Army no longer looks west. Although there is still a garrison on the Northwest Frontier, although there are still Indian divisions in Italy and around the Mediterranean, India now faces east towards the coming war with Japan. In that war the truck is to a large extent replaced by the mule, the boat, the porter, and even the elephant. The tank and field gun yield pride of place to the Bren and tommy gun, the bayonet and the knife. The infantry is supreme once again.

It is wrong to suppose that the Indian soldier takes to the jungle as of nature born. It is just as strange for many of them as it is for the man from Leeds or Devon. The Punjab, the Deccan, and Rajputana, from which the majority of the fighting men are still recruited, do not contain jungle of the type found along the Burma frontier. The climate, too, is trying and the damp unaccustomed. The men have to be acclimatized, the fear of the jungle removed, and everyone made dependent on self and self alone.

The Indian Army has expanded from just

over two hundred thousand to something more than two million. It is therefore exceptional to have even three regular officers in a battalion. The number of regular Indian Army officers in General Headquarters at New Delhi is now very small, for they are all required with units and formations. The remainder of the officers in a unit are what the Navy calls "Hostilities Only" officers. These are both British and Indian, and although the proportion of Indians is far higher than it was pre-war, the majority are still British. The first to join were the planters and business men, and they have done exceedingly well. Now recruitment for British officers is entirely from home. It is of the greatest importance that they should be of the best type, for a bad or indifferent officer in an Indian unit can do an almost incredible amount of harm.

The type of Indian who presented himself for a commission early in the war was on the whole excellent—young men of good fighting stock with a tradition of leadership. The standard in the Royal Indian Navy is particularly high. There were, of course, candidates who failed for reasons of insufficient education, inability to speak English, or lack of the qualities of leadership. Considerable numbers of Viceroy Commissioned Officers have obtained commissions and have turned out well. The hope has been expressed in some quarters that the future leaders of India will come from among these young officers. They will have learned leadership in the best and hardest of schools; they will be men of action rather than of words; they will have learned to sink differences of caste, class, and religion for one overriding cause.

Antiaircraft Artillery in Encirclement Operations

Translated at the Command and General Staff School from a Russian article by Major K. Lavrentiev, in *Krasnaya Zvezda* (Red Star) 30 March 1944.

WHEN German units find themselves in a ring of encirclement and all their efforts to pierce it prove unsuccessful, they use transport aviation. Big three-motored Ju-52 planes supply the encircled troops with ammunition, fuel, and food. Not infrequently, they bring reinforcements and arms. The Germans try to maintain aerial communications even with separate surrounded garrisons in order to prolong their resistance, to immobilize in these sectors as many of our troops as possible, and to save officers and the most valuable military material. The struggle of our antiaircraft artillery with the enemy transport aviation is, therefore, a very important task in the operation for encirclement.

Good results were achieved by the antiaircraft men during the epic battle of Stalingrad. They were ordered to cut all aerial access to the Germans, to prevent any aid from reaching the troops of Paulis from the air, and not to allow the enemy to evacuate his manpower from the ring of encirclement. In order to accomplish this mission, the anti-

aircraft men blocked by barrages all aerial routes, particularly along railroads, highways, rivers, etc., over which the Ju-52 planes usually flew. The German fliers began to change their routes in the hope of getting through the places where there was no antiaircraft artillery. Then our antiaircraft artillery began to rove from one place to another, hunting the "Junkers" along their new aerial routes.

Skilfully cooperating with the fighter aviation, the antiaircraft men effected an impassable aerial blockade at Stalingrad, as if the ring around the surrounded German divisions were lifted many kilometers upward. Taking into consideration the experience of the Stalingrad defenders, as well as that of other antiaircraft units, let us examine some of their methods in fighting the enemy transport aviation.

It is obvious that the necessity of antiaircraft fires should be taken into consideration in planning and preparing the encirclement operation. A sufficient number of antiaircraft

guns should be used in the operation. The first mission of the antiaircraft artillery is to cover our troops during the initial period of the battle for encirclement, particularly the mobile groups, inasmuch as they will be at that time the target of the bulk of enemy aviation. Next, the senior commander of the antiaircraft artillery should locate his fire means along the ring of encirclement so as to cover our troops in the directions of probable counterattacks of the enemy (from outside and inside) and to cut all possible routes of the enemy transport aviation.

The efforts made by the enemy aviation in the support of the counterattacks of the ground troops will be particularly intense. It is, therefore, necessary to have sufficient antiaircraft reserve for strengthening the antiaircraft defenses of the encircling troops, and for organizing the aerial blockade. The success here depends mainly on the speed of maneuvering the reserves. It is advisable to detail such reserves even during the preparatory period and to keep them moving behind the troops which are to effect the encirclement of the enemy. This will enable the antiaircraft artillery to start the blockade at the right moment.

German transport planes usually fly at an altitude of from 500 to 800 meters, in groups of fifteen to thirty planes. Unlike the bombers, they do not have to maintain their battle course. At the first burst of antiaircraft shells they disperse and use the antiflak ma-

neuver. As soon as the German aircraft suffer casualties inflicted by our antiaircraft fire, they change their routes, fly in small groups or singly, raise their altitude, and often shift to night flying. The antiaircraft men should carefully watch all methods of the enemy fliers and promptly take necessary measures when they are changed.

Experience shows that in addition to the bulk of antiaircraft means which protect our own troops and cut the main routes of the enemy aircraft, it is necessary to have mobile antiaircraft units, which use the ambush method, suddenly appearing in places where the Germans do not expect them.

Among the antiaircraft means for combating transport aviation, there should also be long-range guns capable of hitting planes flying at high altitudes. For night firing, searchlights should be extensively used.

Firing at enemy transport planes requires suddenness, which is one of the main conditions for effective fires. It is not advisable to fire at a group of Ju-52's when they are far away. It is better to let them approach, and then open massed fire. Many antiaircraft units achieved good results in this regard, with an average expenditure of twenty to twenty-five shells for each downed plane. During the battle of Korsun, some units armed with small caliber antiaircraft guns and antiaircraft machine guns downed enemy transport planes in two or three bursts.

Combat Experiences of a Forward Observer

Translated at the Command and General Staff School from a German article in *Artilleristische Rundschau* January 1944.

AMONG the difficult situations, from the standpoint of the artilleryman, belong forest and swamp fighting, fighting in so-called "featureless" terrain, and night fighting.

The following example shows how the forward observer, even under the most difficult of conditions and with the simplest of means, is able effectively to support the infantry.

The infantry battalion had left Gorki heading southwest (see sketch). In spite of enemy

resistance, the fighting had developed favorably, but was temporarily halted for the purpose of regrouping the forces in the swampy woods one and a half kilometers west of the said village. The forward observer and his radio operator, who were with the leading company, were in the meantime put out of action. Another forward observer was immediately sent forward to replace him.

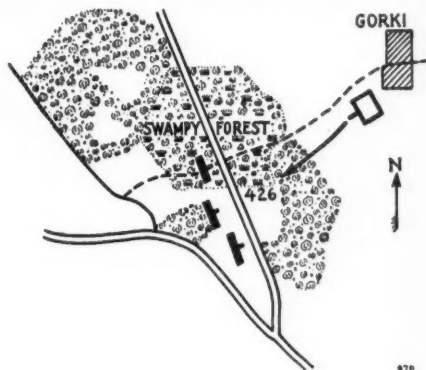
In the meantime, the infantry attacked

again. Just before reaching a highway, it encountered stiff enemy resistance and, as night was coming on, was obliged to halt the attack. The forward observer received the order to adjust a barrage in front of the company. It was completely dark. No light could be shown because of the proximity of the enemy. Radio contact was very weak. In spite of this, however, the barrage was adjusted in the following manner: As a result of thorough orientation by means of the map the preceding day, Target 426 was known to the forward observer. He assumed as his own location a point 300 meters north of Target 426 and 100 meters east of the highway. He requested a high burst on Target 426. It burst, however, but a few meters to the side of us. The purpose was achieved. It was now possible for the battalion to adjust its fire and lay down the barrage.

On the following morning it was learned that we were only fifteen meters from the highway and about 120 meters north of Target 426. Orientation with the help of the battery was more dependable, therefore, than

the orientation that could have been effected after our zigzag movements in the dark through the brush-covered ground.

Thus, a resourceful forward observer is



able, if necessity requires it, to get his battery into effective action as long as he still has at his disposal any means of communication.

Russian Mechanized Warfare

Digested at the Command and General Staff School from an article in *The Times* (London) 8 April 1944.

THE war has reached a phase in which the Red Army is beating the *Wehrmacht* in that very field in which the Germans previously excelled—mechanized warfare.

In those parts of the front where armored units are operating at full strength, and these include at least the 1st and 2d Ukrainian fronts, the composition of fighting units and the tactics employed are in a military sense an advance on methods which the Germans had previously used so successfully. Nowhere is this more striking than in the use of antitank weapons now attached to Soviet tank units in far greater strength than in the German panzer armies which attacked in the west and later in Russia. It has often been pointed out by students of tank warfare that when two substantially mechanized

armies clash the success of the stronger is likely to be indecisive unless the armored units with which he breaks through are well enough equipped to prevent his opponent from fighting a way out of the encirclement or deep pockets into which he has been forced. That, it is held, was shown during the phase of operations on the eastern front when Germany was on the offensive.

The frequent fading out of German panzer thrusts were due not so much to supply difficulties or to the inability of wheelborne infantry to keep up with tracked vehicles—factors which the German Command had clearly allowed for—but to something that, perhaps because of experience in Poland and western Europe, had not been foreseen; namely, the capacity of the mechanized Red

Army to retreat in order or to punch its way to safety, and take up new positions for defense. It is this factor, and not "inexhaustible reserves" or "boundless space" (phrases which tend to make Russian fighting men lose patience) that explains the German failure to destroy the Red Army.

Long before this war Russian military theory envisaged the tank, not as a supporter of infantry, but as a machine requiring infantry support, and now that huge armadas of them are in action there is no shortage of infantrymen for this special task. Normally they travel in their own vehicles, but on short raids they are often carried on top of the tanks themselves. Thus Petain's estimate, after the first World War, that it would probably be fifty years before infantry would be tankborne has been proved to have been conservative. Further support for tanks is provided by low-flying aircraft, and it is significant that it is on the front where coordination between Illiushin 2's (Stormoviks) and the fast, powerfully armed T-34 tanks has been closest that the most spectacular tank successes have been scored. The mechanized forces which under Marshals Konev and Zhukov have pushed forward to Rumania and the Carpathians are thus something like huge mobile fortresses possessing not only deadly striking power but all the necessary means of self-defense; and it is their dual purpose which is making possible thrusts of which the following is a typical example.

An armored group under Major Korolkov was detailed to slip through a gap which had been opened as the result of a distraction made by the artillery on an adjacent sector. The maneuver took the enemy completely by surprise. The leading tanks broke into a village while most of the garrison were asleep and, before sweeping on, destroyed several artillery batteries which had no time to open fire. Then a small river was forced, a minefield circumnavigated, and a column of marching infantry attacked with good result before the enemy realized that the tanks were not their own. The Germans then lost track of the entire group, which, after a day

spent in concealment, approached a strongly fortified position. Here Major Korolkov divided his forces; one group reached a railway station just as two loaded trains were about to leave. These were seized by the infantrymen, and in the ensuing panic the tanks bore down on some 300 German soldiers, using their machine guns and crushing the Germans with their tracks.

So unexpected was the attack that after it a German officer arrived in a staff car to ask why the trains had not left. The tanks went on till they reached a point forty miles ahead of the main Russian lines. The enemy was then in hot pursuit, hoping that Korolkov would run into a trap by failing to take into account the river ahead of him, where powerful antitank units were assembled. The Russian commander, however, in contact with his reconnaissance aircraft, switched the direction of his advance, caught the enemy on an open flank, and completely routed his opponents. The way now lay open to the town which was their ultimate objective, and into this the tanks streaked, putting a long line of lorries into complete confusion.

That operation, which is held up as a model, shows Russian tank tactics at their best. Their aims are to paralyze the enemy by restricting his mobility (his subsequent annihilation is not a task for tanks, but falls on the main forces following them up); to freeze his reserves by striking at roads and railways, thus limiting the chances of his being able to protect his open flanks from attacks by Russian forces moving forward; and to reach bridges so far behind the enemy's lines that his sappers hesitate to demolish them.

In broad outlines the present Russian offensive in the south is characterized as follows. First, by choosing to attack in the spring the Russians have taken the flexibility out of the enemy's lines of communication by narrowing them to main roads and railways. By sharply placed stabs at these communications with their mechanized forces they have further reduced the Germans' means of rapid movement. Making the mud, if not an ally,

at least a co-belligerent, they have stripped the enemy of vast quantities of vehicles, thus further augmenting his difficulties. Secondly, by their unexpected forcing of the Dnieper last autumn, the Russians were able to search for and grip the German army in battle. For a period they were on the defensive, but the Napoleonic maxim held good;

a circumspect defensive was followed by a rapid and audacious attack. As at Stalingrad, Voronezh, and Kursk, so before Kiev, Zvenigorodka, and Uman, the great tank attacks came only after desperate antitank fighting. It is in the antitank guns as much as in the tanks themselves that the reason for the Red Army's successes must be sought.

The Sniper

Translated at the Command and General Staff School from a German article by Captain Borsdorf of the Reserves in *Hamburger Fremdenblatt* 9 May 1944.

EMPLOYMENT of weapons, their effects, rules of combat, and tactical concepts change constantly. The various tendencies come into being and disappear. Highly technical forces with their ultra-modern combat equipment and methods are employed alongside the most primitive of combat methods. Today, development is going on at both extremes, in this the fifth year of the second World War, in which the crew of the rocket battery works along with the sniper who moves and shoots almost like the Indian.

Thus the Russians, who constantly developed and, with the greatest skill and adaptability, altered their tanks, at the same time produced their snipers who are characterized by craftiness, cunning, and effectiveness that is simply unsurpassable. Since 1930, the Russians had tried to organize their snipers into an elite corps. As in the case of the paratroops and "tankists," the steady advancement of this arm was the aim of Soviet military policy. In addition to this, they had for years familiarized the people with the rifle and had made shooting almost an obligatory matter in their training. In the motion picture theaters, films regarding the rifle and its care were continually shown. Mastery of the weapon was rewarded by a uniform marksman's decoration. We have felt the results of these efforts during the eastern campaign. The Russian soldier was and is, as an individual fighter, a factor that must not be underestimated and, indeed, the Russian sniper has for a long time been a

very real factor which has influenced the training of our modern infantry.

In spite of the war of masses and matériel, the individual fighter still lives unchanged today, and his cleverness and ability are often able to bring the decision in certain phases of the fighting. At some time or other, every one has to dismount from his vehicle and face the enemy at close range. He will then be able to survive only when he is really master of his firearm, especially his rifle. The eastern campaign especially has again given prominence to hand-to-hand combat and, at the same time, emphasized the necessity of adapting oneself to the terrain—even of disappearing in it.

The German snipers now oppose the Russians with their excellently trained men, and they are fulfilling their mission. For a long time now a special course for snipers has been in progress. The sniper is not new in the German Army. Even at the time of the trench warfare in 1914-1918, this well-trained individual fighter was known, and gave the enemy plenty to worry about. But it was not until the advent of this war that a special type of combatant was developed within the limits of the infantry.

Not everyone becomes or is able to become a sniper. Not every one meets the necessary requirements. Natural proclivity, passion for the chase, fanatical love of firearms—these assure the results required of the sniper. For this reason, the sniper receives a fully dependable, high-grade weapon, the M-43 rifle,

equipped with the telescopic sight and with uniform ammunition of best quality. His training is not a matter of a few days, but covers a period of four weeks which, after the completion of previous basic infantry training, is intended to provide him with a complete mastery of the technical side of firing and perfect him in his combat training. Firing and the study of terrain occupy the foreground in the sniper school, and stir the enthusiasm of every young man who is interested in the infantry. For the things that are here offered and required in the way of training are exactly those things that are very far removed from the usual experiences of the "doughboy" and open the way to the romantic side of war.

The things done by the German sniper today must be designated as literally astounding. He is able to disappear completely in the terrain, to dive down into foxholes that are not visible even by the use of field

glasses, to take on the appearance of a pine or a birch tree, or to construct his lurking places with wonderful ingenuity—all with the object of concealing himself as completely as possible from the eye of the enemy. On the other hand, it is the task of the sniper to keep a constant watch over the enemy's position and recognize immediately every suspicious activity. This requires a deep knowledge of nature, in addition to cunning, rapidity of decision, and the capacity for independent action. Indeed, the sniper is to a large extent left to his own resources.

As has already been stated, the value of the sniper has been recognized and an intensification of this type of infantry training has been recommended. This, however, will depend on how far we succeed in intensifying the pre-military training. So far, we can see that our efforts along this line have worked out in a very satisfactory manner.

Selecting Army Personnel in Great Britain

Digested at the Command and General Staff School from an article by "Gideon" in *The Journal of the United Service Institution of India* October 1943.

SINCE this war began, there has developed in Britain an entirely new method of allocating men within the army, and of selecting soldiers for training for special jobs. The work, which was started early in the second year of the war as an attempt to select personnel by scientific methods, is now firmly established as being one of the greatest advances that has been made towards the goal of economic use of manpower, abolition of human wastage, and making the best use of resources.

The problem resolves itself into two main divisions:

1. The selection of suitable fully-trained recruits for training to become officers.
2. The selection of suitable raw recruits for early training as NCO's tradesmen, and the earmarking of potential officers.

By tradition, the British Army officer is born rather than made. For many genera-

tions during periods of peace, candidates for the King's Commission have come forward at their own request, their choice of profession following personal liking and family tradition. The majority have come from within narrow social limits, and have been educated at a particular type of school.

The task of selecting suitable applicants has, therefore, been relatively easy, and has depended on social and educational qualifications.

On the outbreak of a national war, the situation changes. The increased demands come nowhere so heavy as for junior officers, relatively large numbers of whom must be selected, trained, and commissioned under conditions of urgency. During the peak year of wartime expansion in Britain, approximately one hundred times as many officers have been trained as in a corresponding

peacetime period, and the training has taken on the average one-third of the time.

The idea that soldiers who have distinguished themselves on the battlefield should be recommended for commissions is one with an immediate appeal. But quite apart from any consideration of the chance of this method, i.e., of any responsible officer being present at the moment when Tommy Atkins distinguished himself, it was inapplicable. Up to the recent Tunisian campaign, only the British Expeditionary Force and the 8th Army had been in action on any large scale. The former's experience was very brief and very disastrous—large numbers of those actually in action became prisoners of war, and the vast majority of the remainder found little opportunity to display their mettle.

The interview as a method of human selection was by now under great suspicion. It was abandoned as the result of an experiment, when twelve senior officers responsible for Selection Boards in Britain met, and held a secret ballot on sixty ordinary candidates. In not one single case was there unanimous vote for either acceptance or rejection.

Information came to light as to current German and Russian methods. The former, particularly, had gone in for a very detailed procedure, in which prospective officers remained under observation for a period of years, with the more specific phase of selection spread over several weeks. This work was carefully examined. The principle adopted in Britain was that of a residence with a specially constituted board, during which time tests were administered aiming at showing up qualities of personality and leadership.

These boards started from humble beginnings, but from the outset were based on established scientific principles. There has been a steady development; unreliable test elements have been discarded, and new ones are being tried out all the time. The candidates stay with the boards for three days, subsequently reduced in Britain to forty-eight hours, the intake at board averaging about forty candidates at a time.

There are three main types of tests now in

use, the so-called non-verbal, verbal, and reasoning. Non-verbal tests are independent of language, and the main one used in the army consists of a series of patterns cunningly drawn to show a definite logical relationship with each other. The candidate's task is to appreciate this relationship.

The ability to manipulate language successfully and quickly is also an important aspect of "teachability," and "verbal" tests have been devised in which simple problems are set and directions of varying degrees of complexity have to be followed. This test is a race against time, as also is the "Reasoning Test" which consists of a battle of wits between tester and candidate, in which, all the time, the candidate has to detect the underlying principles of a series of statements and propositions.

The above tests require answering in writing, and are given in groups of fifty. As a further check, there are individual performance tests, in which candidates are given problems to solve in designs and three-dimensional patterns which require the ability to size up a situation quickly, and a reasonable degree of manual dexterity.

The intelligence that is measured has many aspects, and the final voting is a combination of the results of all the above, due attention being paid to individual idiosyncrasies, special abilities, and special disabilities. An all-round estimate is desired, and since many hundreds of thousands of soldiers and over 30,000 officer-cadets and officers have sat these tests, we are able to compare each man's result with the results of thousands of his comrades similarly employed in the army. It is a cardinal principle of army intelligence-testing that the standards used are not those of abstract theory, but of the actual performances of an equivalent group of men. We therefore measure a candidate against the performance of the average British officer, or against any other military group with whom he is likely to be associated.

Tests of Personality.—Of these there are two types in use, respectively the province of:

(a) *The Psychiatrist.*—In applying himself to this work he uses three main methods:

Written tests of a novel type where candidates' imagination is given free run; observation of behavior in a group; and his own special type of interview based on professional training.

He sets out to assess the essential soundness of a man's nature, and by paying attention to his past history, he finds out how the candidate stands in relation to his endowments and opportunities. He takes a long and comprehensive view, and uses his experience to indicate to the board likely developments of character.

(b) *Group Testing Officer.*—The opinion of a junior officer of known efficiency is considered to be valuable. Accordingly, the technique was devised to give the Group Testing Officer, who is normally a thirty-year-old Captain or junior Major, opportunities to observe candidates, and to see their practical capacity for living with, and influencing, their fellows. When candidates arrive at a board, they are divided into groups of ten, each group being the responsibility of a Group Testing Officer. He lives in close contact with them, takes meals with them, observes them in the camp and in the ante-room, and also puts them through a series of tests.

There are two types of tests: group and individual. They are of the nature of common-sense problems requiring no particular military training, but most of them need some form of physical work for their effective solution. There is no set form laid down nor any apparatus, use being made of surrounding country and any material on the board premises.

A typical group test is one where five men are given a heavy object, which they are told is valuable and fragile and they must get it and their party across a twenty to thirty-foot ravine. A collection of useful material is lying about—poles and ropes—and the candidates have to devise a method of bridging the gap.

The actual solution of the problem is of no great interest. Group Testing Officers are trained to give their attention to the behavior of the individuals comprising the group. The tests are devised to vary as much as possible,

and on them he forms a judgment on each individual on his initiative and resourcefulness, his capacity to command, his guts, and also whether he has the necessary agility and physique to succeed at a Cadet Training School.

The president of the board is a senior officer with a wide experience of the many aspects of army life. Apart from his general function as the commanding officer of a military unit, he also sees candidates about the camp, and talks to each of them individually.

On the last day of the board's sitting, decisions are made about candidates by means of a conference of board members with the president in the chair. Each member gives his grading in turn, and if, as frequently happens, gradings agree, a man is passed or failed without further discussion.

By a system of careful recording, and with the mass of evidence available, we are able to keep a careful watch on the quality of candidates. Previously any such estimate has had to be based on individual likes and dislikes and on a president's ability to carry a memory over a period of months. In this new system we have a record of the performance of each candidate in each test item. An elaborate follow-up of successful candidates has been organized for comparison with their graduating at Training Schools and with their records as fighting soldiers.

The first year's work on the new system in Britain has given striking results. For instance: there has been an enormous increase in the supply of candidates, the rate of volunteering having increased eight times. This is considered a measure of public confidence in the new methods.

The failure rate at Officer Cadet Training Units has fallen from twenty-five percent to two percent and of Cadets commissioned there has been an increase of fifty percent among those considered above average standard. This very satisfactory start has moved the War Cabinet to set up a scientific committee to enquire into possible wide applications of the technique.

To complete the description of the application of selective testing to the modern

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army, brief attention must be paid to recruits, although this is more properly a subject for an article of equal length. In Britain at the outbreak of this war, the time-honored procedure of mass allocation of recruits, by districts and by local service needs, was followed. It has since been entirely abandoned because of its wasteful results and the unfortunate effect on morale.

The introduction of the General Service Corps in Britain has been a great advance in military training methods. Under this scheme recruits go to Primary Training Centers which belong to no specific arm of the service. They remain there for the first six weeks of their training, during which time they undergo all the routine procedure of the first few weeks of military service; medical examinations, inoculations, issue of clothing and equipment, and elementary instruction in army life and procedure, basic infantry training, square drill, and elementary weapon training.

During their first fortnight, each recruit undergoes a standard program consisting of various tests of intelligence and special aptitudes. He is also interviewed by the Personnel Selection Officer, whose job it is to assess a man's civil experience in relation to its value to the army. By means of intelligence tests, a man is graded according to his ability to be trained for a military trade. The special aptitude tests make it possible to say whether the man has a flair for engineering, clerical work, or for one of the manual trades. It should be reiterated that in all these tests the

standards required are those of the actual achievements of recruits and in no case is the man measured against a theoretical ideal.

At the end of the six weeks' training the record of each soldier is completed and contains a recommendation for type of employment (usually three per man) in order of priority. By means of an automatic filing device, when the War Office require, say, 10,000 blacksmiths to be posted, only the names of those with the required qualifications are thrown up by the machines.

As a result of the Primary Training Center's recommendation, recruits are posted to Corps Training Centers where, for the first time, they become identified with a definite military unit. This change of procedure has given widespread satisfaction, on account of the reduction of training time and of lessened wastage by unsuitable recruits, and in the higher general level of efficiency obtained at Corps Training Centers.

The scheme outlined above shows that in Britain it is possible that out of a war-time emergency measure, a project of great future social benefit is developing.

There are many other possibilities, some of which have already been described above. It is of very great importance that a project of this type should be, as far as possible, an indigenous growth. As with all scientific procedure, there is a core which is international, with a world-wide application; but any method of human assessment must vary in its actual technique with differences of culture, social custom, religion, and social structure.

Keep the Jap Guessing

Digested at the Command and General Staff School from an article by
 "Rajah" in *The Journal of the United Service*
Institution of India July 1943.

The Jap, as we know, is not good at either invention, design, or application of weapons. He relies primarily on cunning and a set drill; let us, therefore, see how we can keep him guessing with regard to inventiveness in the employment of weapons. Here are

some suggestions as to how this might be achieved by the use of antipersonnel mines in forward areas. There are a thousand and one others which deserve equal consideration.

Antipersonnel mines of the push or pull trip-wire type may be laid around, or, if

holding a broad front between localities watched by small standing patrols, these then afford an added safety valve as to when the SOS defensive fire signal should be fired by company commanders in forward areas. Should the enemy wish to discover our gun positions, machine guns, or infantry posts, he might send out an infiltration party, a raiding party, or even an attacking force with a limited objective, by day or night, possibly supported by artillery or mortar fire. Should these succeed in passing through our wire, and overrunning or infiltrating between our forward defended localities (FDL's), in nine cases out of ten the SOS would be fired, defensive fire would come down on prearranged targets, and, in addition to having little or no effect on those who had reached our FDL's, would give away our gun and infantry positions; whereas if our defenses contained some antitank mines where necessary on tracks or open paddy areas, and antipersonnel mines as well, ample warning would be given, and company commanders concerned would have a much better impression of the scale of enemy attack before calling for defensive fire. Moreover, the chances of gaining identification of the enemy would be very much better, and the chances of his reconnoitering our position or removing our antitank mines reduced.

Antipersonnel mines could be used as a means of thickening up defensive fire on the front by setting them as booby traps in likely concentration areas of thick jungle or dead ground that cannot be engaged by fire from forward defended localities, but into which the enemy or his patrols might move. This would force him into the open, surprise his patrols, and at the same time inform us. In thick jungle, where artillery observation is difficult, antipersonnel mines could take the place of defensive fire in certain areas where accurate ranging is impossible. It would give ample warning of, if not prevent, infiltration between our localities or round the flanks of a locality.

They could be used in the more open places as a guide by day as to when enemy armored

fighting vehicles and infantry should be engaged by fire. Our artillery and infantry fire is invariably drawn too early, with a consequent lack of effect, instead of waiting until the enemy is in difficulties on our mixed minefield, and then hitting him hard and accurately with everything available.

They could be employed as an aid to the effective control of infantry and vehicle gaps into the position, or to flank ambushes on roads or tracks both by day and night. It is folly to imagine that gaps in defenses can be closed hurriedly if our reconnaissance units, armored fighting vehicles, or patrols with drawing through the position are closely followed. Infantry gaps can be made very narrow and safe by laying antipersonnel mines along both sides while they are in use; these mines can be controlled by pull wires or, if circumstances permit, from the nearest post to go off in pairs or more, and could knock out the whole of an enemy patrol if skilfully laid and set off.

Vehicle gaps, whether in the open or on jungle tracks, should be tactical gaps only in fact ambushes, so that any attempt to follow up would be stopped by forward troops flanking the gap. By night, all gaps should be closed, except those in use by our patrols and they should be watched very carefully during the absence of the patrols. Antipersonnel mines with flare attachment could even be placed by our patrols on all approaches leading from known enemy positions; this would have the effect of preventing his movement by night or giving us ample warning that he was on the move.

I am convinced that the extended use of antipersonnel mines and booby traps would add to the defense an element of surprise which is lacking, and it would affect the enemy's morale accordingly. Only by new inventions and by constant thought and change in the method of employment of existing weapons offensively will our morale be retained at the highest level, and that of the enemy reduced.

In other words, "keep him guessing."

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